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March, 1898.

NAVY DEPARTMENT.
BUREAU OF MEDICINE AND SURGERY.

SANITARY AND MEDICAL REPORTS

FOR

1873-74.

BY

OFFICERS OF THE U. S. NAVY.

PREPARED FOR PUBLICATION, UNDER THE DIRECTION OF THE SURGEON-GENERAL OF THE NAVY,

BY

H. C. NELSON, M. D.,
SURGEON, U. S. NAVY,
ASSISTANT TO THE BUREAU OF MEDICINE AND SURGERY.

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NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
December 15, 1875.

The papers embraced in this volume were written without any expectation of being published, and their authors have had no opportunity of revising the manuscripts or correcting the proofs before the latter were committed to the hands of the printer. In consideration of these facts and the intrinsic excellence of many of the essays, it is hoped that due allowance will be made for defects of composition and irregularities of arrangement, which, under different circumstances, might easily have been avoided.

This publication is the first of the series on the subjects to which it relates. It is the intention of the Bureau annually, hereafter, or whenever a sufficiency of material may be at command, to issue a similar volume; and it does not doubt that the mere announcement of this purpose will be an adequate stimulus to medical officers to prepare their contributions in a style that shall reflect credit on the corps, as well as the service to which they belong. The great aim of these publications is to improve the sanitary condition of our ships of war, and this object will be steadily kept in view, but it is not designed to exclude from their pages essays on cognate or collateral subjects. On the contrary, the Bureau will gladly receive and publish observations on botany, natural history, climatology, ethnology, or kindred topics directly or indirectly connected with the science of medicine. By this means, in the course of a few years, a body of facts relating to the various countries visited by our vessels of war will be obtained, that may be of the greatest value not only to the Navy, but to many of our countrymen who are engaged in foreign commerce.

J. BEALE,
Surgeon-General United States Navy.

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PART I.

SANITARY REPORTS

FROM

MEDICAL OFFICERS OF THE UNITED STATES NAVY.

1873-'74.

SANITARY REPORTS.

NORTH ATLANTIC SQUADRON.

1873.

NORTH ATLANTIC SQUADRON, 1873.

REPORT OF THOS. HILAND, M. D.,
Surgeon U. S. Navy.
U. S. S. WYOMING.

HYGIENE.

Complement of officers and men, 200; cubic air-space per man in wardroom, 595 feet; in steerage, 791 feet; on berth-deck, 89 feet; under forecastle, 106 feet; percentage of sickness, 1.51; deaths, 0.

Ventilation.—The ventilation of the cabin is excellent. Of the ward-room, good in the forward portion; in the after part, poor, needing ventilators leading to the upper deck, and air-ports through the ship's sides into the pantry. There are two small holes called ventilators leading from the pantry to just below the taffrail of the poop, but they are wholly inefficient. Of the berth-deck, fair in the forward part; aft of the main-hatch very deficient. Two large ventilators, which should at all times be kept open, could be fitted to the openings for the coal-shutes to relieve this portion, which is always hot and stifling. The forecastle is comfortable and of good size. The engine and fire room are fairly ventilated. A portion of the bilge is sealed by store-rooms, so that it cannot be reached; the remainder is generally kept well cleaned and disinfected. Unhealthy odors from the bilge are frequently noticed, but they are seldom oppressive. Means should be taken to make every part of the bilge accessible for thorough cleaning and disinfecting.

Lighting.—Is as good as in most ships of this class.

Warming.—By steam-heaters in cabin, wardroom, steerage, and berth-deck. Steam is from one of the main boilers, there being no small one. The galley is placed on the berth-deck, and causes that deck to be oppressively warm when the air-ports are closed and the weather warm. Temperature of engine-room, 95° to 98°; of fire-room, 105° to 110°.

Water.—Quality, good; source, condensed in tubular condenser from sea-water. Capacity of tanks, 3,700 gallons.

Food.—Of good quality, well prepared, and the waste is trifling. Three months' provisions can be carried.

Clothing.—As at present issued, the outfit-suit looks ungainly, is poorly made, and of inferior quality. The ready-made clothing is generally unsatisfactory. The material issued for making clothes is of good quality, and well adapted to the service. A gradual change for the better is noted. Plaited hats of light material, as straw or palm-leaf, should be worn in warm, pleasant weather.

CLIMATOLOGY.

No instruments having been supplied to the medical department of this ship for accurately measuring temperature, humidity, &c., it is not considered satisfactory to copy from the ship's log.

MEDICAL TOPOGRAPHY.

Aspinwall, situated on the small island of Manzanilla, is notoriously an unhealthy place, but an acquaintance with its climate-surroundings and mode of life of its people teaches that reports concerning its fatality have been exaggerated, and that it compares favorably with many malarious portions of the United States. Limon, or Navy Bay, its harbor, is only an indentation in the coast, open to the north, bounded on the west by Point Toro and the ridge connecting it with the mainland, beyond which are the marshes of the mouth of the Chagres River; on the east by Manzanilla Island, in width two and

one-half miles, and length about three and one-half miles, measuring from a line drawn between Point Toro and Manzanilla Point south to the mainland. The island is mostly a swamp, save on the beach and the land made by refuse matter of the town, scantily covered by soil from the mainland. The population numbers about two thousand, of which about two hundred are white, the remainder negro and mixed races. For the most part every sanitary measure is disregarded, and, except the northern beach, where the officers and employés of the Panama Railroad live, the stench from the badly-kept houses and pools of filth is almost intolerable. The trade-wind blows in from the sea for about six months of the year, from November to June, and to its purifying influence all the good is ascribed. The remaining six months there is much rain, and the wind light and variable, with occasional squalls from the southwest. The wind most dreaded is that coming across the inner bay from the Chagres swamps; and, hence, any vessel anchoring near the head of the bay to escape the constant rollers coming in from the sea, or for any other reason, are almost sure to have malarious fevers of a severe type, and even if anchored outside the bay proper the excessive dampness and almost constant rain during the summer-months has a very depressing effect. The diseases most prevalent are intermittent and remittent fever and dysentery. Every disease seems to have a malarious element. There is very great mortality among children, and the natives seem to care very little whether they live or die.

The hospital at this place belonging to the Panama Railroad Company is capable of containing forty patients, but seldom contains more than half that number. It is a two story house, of wood, with piazza on two sides, well lighted and ventilated, but built in a cheap manner, the kitchen being in a separate building. There is no dining-room, and the building is

poorly supplied with water-closets or means for bathing; altogether an unattractive place.

Yellow fever is sometimes brought here by vessels, but seldom exists as an epidemic, and by most residents it is said never to originate in the place, though many of its accompanying elements exist.

In October, 1872, a disease, called "tablon" by the natives, and thought to be brought from Carthagena, decimated the colored people, but seldom attacked the white. Its exact nature I am unable to learn; but its symptoms were those of cholera morbus and severe remittent fever combined.

Records of the rain-fall for the past five years I take from the hospital, as follows:

Months.	1869.	1870.	1871.	1872.	1873.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
January	.83	4.30	15.42	3.57	6.31
February	.77	3.30	.53	.75	.25
March	.49	4.95	.05	.83	.13
April	5.04	6.46	1.52	1.30	2.18
May	6.72	20.95	1.63	21.43	3.92
June	10.66	12.48	7.70	22.00	13.20
July	18.22	15.60	23.27	19.90	12.50
August	14.02	16.35	11.56	19.97	10.69
September	8.98	6.74	8.00	16.20	10.91
October	14.82	11.21	12.58	32.00	14.30
November	24.03	32.42	12.38	19.11	11.77
December	10.10	14.85	4.99	13.12	.72
Total	114.23	149.64	99.58	170.18	86.88

Temperature is equable, about 83° or 84°; extremes, 76° and 90°.

The cruising of this ship for the year has caused a visit to but one port where an epidemic was raging—Kingston, Jamaica, 14th and 15th of November. Yellow fever was prevalent in the shipping and in town, but of a type less virulent than many others that have visited that place.

The ship has been free from epidemics of disease, and the crew is well disciplined, happy, and efficient. The boilers are worn out and are wholly unsafe, and expose to great danger all those who are in the fire-room when steam is raised.

REPORT OF B. H. KIDDER, M. D.,

Surgeon U. S. Navy.

U. S. S. OSSIPEE.

HYGIENE.

Complement of officers and men, 245; cubic air-space to each of 170 men billeted on the berth-deck, 117 feet; 52 men, billeted on the spar-deck, are practically in the open air, except when housed in by boom-cover and curtains; officers' rooms contain on an average about 340 cubic feet.

Ventilation.—The berth-deck is provided with three hatches and two large ventilators, well placed. The air-ports cannot be kept open at sea. This part of the vessel is as well ventilated as could be expected. The after part of the wardroom, and especially the after state-rooms, are inadequately ventilated, there being no hatchway in that part of the vessel.

Lighting.—As usual, by lamps and candles.

Warming is by steam-heaters. All parts below decks can be rendered comfortable in winter. The men billeted on the spar-deck are necessarily exposed to the cold.

Water, of excellent quality, is distilled on board.

Food.—The nature of the service has not allowed of a sufficient supply of fresh food.

Clothing.—Usual quality, and sufficient.

The crew cannot be comfortably berthed, and there are not proper store-rooms to allow of taking fresh provisions to sea for officers or men. The vessel is low between decks, and has not a flush berth-deck.

The places visited since October 10, when we went into commission, are New York, Newport, Norfolk, and Key West. Our passages were marked by heavy gales. Notes on climatology cannot be usefully tabulated, and no remarks seem to be called for under the head of medical topography.

Report of F. L. Dubois, M. D.,

Surgeon U. S. Navy.

U. S. S. Pawnee.

HYGIENE.

Complement of officers and men, 56; average number of ship's company, 61.5; cubic air-space to each man, 1,462 feet; to each steerage officer, 2,998 feet; to each wardroom officer, 2,315 feet; to the commanding officer, 11,270 feet; percentage of sickness, .11; of mortality, .01.

Ventilation.—Cabin: Length, 57 feet; average width, 30 feet; height, 7 feet. Ventilation good, by two windows astern, four on either side, and two hatches in spar-deck. Wardroom and after-cabin: Length, 57 feet; average width, 25 feet; height, 6.5 feet. Ventilation tolerable, by seven air-ports on either side and two hatches communicating with spar-deck. Steerage: Length, 61 feet; average width, 30 feet; height, 6½ feet. Ventilation tolerable, by seven air-ports on either side, and a very small hatch communicating with the spar-deck. Gun-deck and forecastle: Ventilation excellect, by twelve windows (3 feet by 3 feet) on former, and four gun-ports on latter, and by five hatches. It is spacious; length, 174 feet; width, 43 feet; height, 9 feet. Berth-deck: Length, 101 feet; width, 44 feet; height, 6½ feet. Ventilation not sufficient for hospital purposes. There are eight air-ports on either side, and three hatches communicating with gun-deck. For use as a hospital, windows similar to those on gun-deck should be provided. Wind-sails are provided for the lower cabin, wardroom, berth-deck, and steerage.

Lighting.—The ship is lighted by the windows, hatches, air-ports, and gun-ports, mentioned under ventilation.

Warming.—Stoves for this purpose are furnished the cabin, wardroom, and berth-deck, but are not required in this climate.

Water.—Rain-water and condensed water are used; both con-

tain more or less chloride of sodium. It is caused in the former by the spray blown upon the roofs during gales, and could be in some degree prevented by allowing the first washings after a gale to run to waste. An average of fifteen thousand gallons of water is kept on board in iron tanks.

Food is the same as on other ships lying in port.

Clothing is that issued in the Navy.

Suggestions.—In addition to those mentioned above, I would suggest that the condenser be stopped when any patients are dangerously sick, and entirely during the hot months, and that the ship be sent North in the spring to prevent the outbreak of yellow fever, as she was infected with it late this season.

MEDICAL TOPOGRAPHY.

The diseases common to the seaboard towns of the south are those which prevail at Key West, Fla., at which place the Pawnee has been stationed last year. Diarrhœa and dysentery are common during the spring and summer, and malarial fevers in the fall, with occasional epidemics of yellow fever and sporadic cases of typhoid. As a rule, malarial fevers are not so prevalent or so fatal as in other southern cities. Owning to the mildness of the climate in the winter, (the thermometer rarely falling below 60°,) the island is resorted to by those troubled with pulmonary and bronchial affections.

For native adults the city is remarkably healthy, and for children during the winter-months, while from May to November the mortality among the latter is great, principally from cholera infantum. Within the past few years several thousand Cubans have immigrated here, of whom a great number die annually. Their filthy habits, the crowded condition in which they live, and their want of stamina are sufficient to account for this. Should the city authorities pay attention to sanitary rules, the sickness among the Cubans and of others would be much decreased.

Establishments for cure of sick, one—marine hospital.

Medical colleges, none.

Evidence of progress of medical science.—A medical society has been established lately, but thus far nothing has been done that is likely to advance medical science.

REPORT OF S. AUGUSTUS BROWN, M. D.,

Assistant Surgeon, U. S. Navy.

U. S. S. KANSAS.

The complement of this vessel is 122 men, 13 marines, and 15 officers; cubic air-space to each individual on the berth-deck, 60 cubic feet. Forty men sleep under the topgallant-forecastle. Percentage of sickness, 1⅜; mortality, 0.

Ventilation is quite sufficient when there is wind, otherwise not. The total amount of air is probably changed five times in the hour under favorable circumstances. It is accomplished by means of two ventilators, one foot in diameter, extending above the vessel's rail, aided, when in the opinion of the commanding officer it is necessary, by two wind-sails, one well forward and the other well aft. In port, when the water is still, ventilation is further assisted by opening the air-ports, of which there are ten. I am of opinion that no improvement is required in the appliances.

Lighting is very defective, at sea especially, when all the ports are necessarily closed. There is only one hatchway. It might be improved by the insertion of dead-lights in the deck, as in the monitors.

Warming is very small in amount; two small heaters (steam-coils) being all the means. I would not suggest any increase in the amount or means, if the ship is to remain on the duty

she has performed for the last four years—stationed in the West Indies.

Water is distilled on board; is perfectly pure, not only to taste, but to tests of nitrate of silver and permanganate of potassa. The supply is always abundant. About 200 gallons are used daily. It is preserved in iron tanks, two in number, 950 gallons' capacity each, and wooden casks to contain 300 gallons.

Food is abundant, nourishing, and well prepared. All food unfit for use is immediately condemned by survey and thrown overboard. In port, fresh meat and vegetables are served out thrice weekly.

Clothing is sufficiently warm and of good texture, all poor clothing being condemned and sold.

I would earnestly recommend the use of white undershirts in a warm climate, to insure cleanliness, which it is almost impossible to preserve when men wear blue, as is stated by Medical Inspector Gihon, in his book on hygiene. I would also recommend that straw hats be used in this squadron. This is practiced on the English ships met in this climate, and there is very little sickness indeed.

ENGLISH MILITARY HOSPITAL, BERMUDAS.

The Bermudas Hospital is situated on a small eminence, near the south end of that individual of the Bermudas group known as Ireland. It is so located as to secure a sea-breeze from three directions, north, west, and south, and the wind from the east almost unobstructed. The grounds are so steep as to require little artificial drainage, but what is needed has been attended to with great care, by means of stone-paved dikes running off in all directions from the buildings; and a covered sewer draining the kitchens, bath-rooms, and water-closets, extends to the water's edge.

There are four wards, 13 feet high, 24 feet wide, and 60 feet long, capable of accommodating about eighty patients in all with perfect comfort. Two wards are situated on the second, and two on the third floor. Down the center of each ward is a succession of tables where the patients take their meals, and the lower end is ornamented with the crockery used, in long shining rows. Common hair-mattresses are used upon narrow iron-framed cots, and the sheets appear very white and clean. Patients eat and sleep in the wards, but when able to leave them are allowed the freedom of the house and grounds, and a quite extensive library of English light literature, history, and travels. Surrounding the wards, on both floors, are broad and spacious verandas, provided with venetian blinds, to protect them and the wards from the excessive heat of the sun in summer, and affording a delightful prospect of the surrounding islands, bays, and harbors. There is a ward, small in size, somewhat removed, in a wing of the main building, where all cases suspected of being contagious are kept until the diagnosis is determined. If the disease proves to be of a contagious or infectious character, the patient is immediately sent off to the pest-house.

There are rooms for the accommodation of eight officers, invalids, which are all that need be desired for light and air, though quite shabbily furnished. Connected with these are a dining-room and sitting-room, very pleasantly and comfortably furnished with easy-chairs, sofas, and a neat collection of books.

The cooking is done in a separate building, on a common range of sufficiently large size to cook for the complement of patients.

Water-closets and bath-rooms are convenient to the wards on both floors.

The water is collected from the roof in rainy weather and

kept in cisterns. No other arrangement exists for water-supply. It may be conveyed from the dock-yard, two miles away, where there is always a good supply.

There are usually from ten to thirty patients under treatment for the general character of sea-diseases—rheumatism and syphilis generally.

In every department the utmost cleanliness is observed, something which many of our naval hospitals, would do well to copy.

The hospital is under command of the commandant of the dock-yard, and officered by a deputy inspector-general and two surgeons of the medical department, royal navy.

The climate of the Bermudas is exceedingly even for a place so far north. In winter the average temperature is about 60° to 66° Fahr.; in June, 83° to 86°; and April to September, 75° to 79° Fahr.

The islands produce a great variety of vegetables. The potatoes and onions have a world-wide reputation, and being attainable at every season, are a valuable adjunct to the treatment of chronic diseases.

The habit of eating in the wards is, in my opinion, very reprehensible, as increasing the amount of organic matter which must of necessity be floating in the atmosphere.

SANTIAGO DE CUBA.

Having remained in this port for eighteen days, and taken especial notice of everything which transpires with reference to the health of the crew, I have been able to detect no deleterious influence upon it by either the climate or the port. With every vigilance, I have permitted all kinds of ripe fruits to be brought on board and freely partaken of by the men. In eighteen days only one man has exhibited symptoms at all referable to the ingestion of fruit, and I am disposed to attribute it to other causes.

This has been my practice in every port, and I am of the opinion that greater harm would result from depriving the men of fruit than by allowing it to be freely used when ripe and not in a condition of beginning decay.

HOSPITAL DEL PRINCIPE ALFONZO AT SANTIAGO DE CUBA.

This hospital is beautifully situated on a commanding eminence overlooking the city, the bay, and the surrounding country, and is exposed to the winds from all directions. Being located so near the sea, it has the benefit of the sea-breezes during the day, and at night the land-breezes from the Sierras del Cobre, which give it every natural advantage for ventilation. Like almost every house in Santiago de Cuba, the hospital is only one story high, and spread out, instead of being built as are American and English buildings of a similar character.

The building consists of four high walls inclosing a kind of court. These walls, which include several acres, are pierced by a number of windows some ten feet apart, so constructed as to appear almost impervious to the light and air, with heavy wooden shutters and strong iron gratings, as if to resist invasion. Some portions of this inclosure are covered with rows of trees, principally the salvadera or sandbox-tree, which is a great favorite here, on account of its luxuriant foliage and grateful shade. Other portions are covered with gardens of various plants and flowers. Between these, or rather among them, are the wards of the hospital, some fifteen in number, situated flat upon the ground, with earth floors. They are supplied with light and air by means of windows on either side, about ten feet apart, and very large and high doors at either end. They are about one hundred and fifty feet in length, and twenty feet wide by fourteen feet high, and are capable of accommodating very comfortably more than forty patients each. There are also opposite to these, in the walls, about double the

number of small wards, capable of holding ten to fifteen each. These small wards on the south side were used for venereal diseases; on the west for officers; on the north for bronchitis, pneumonia, and phthisis. The large inside wards were filled with typhoid fevers, cholera, and diarrhœa, acute and chronic. Of the last-named, there were about two hundred. One ward was crowded with fractures of the arm, of the leg, and of the clavicle. There was a small ward of gunshot-wounds, received up in the country, inflicted by the insurgents. The total number in the hospital at present is 427, and I judge by appearances that the vacancies are nearly all filled up.

The supply of water is very good and of good quality, being derived from a hill, some ten miles distant, by means of a water-pipe, and delivered by a fountain, which is situated in the middle of the court, and a number of hydrants. From these it is conveyed to the wards and other places where its use is required in buckets. I could find no means of bathing whatever, and the steward informed me that all bathing was done in the wards. There is not a bath-room in the entire establishment. In the wards were only small wooden buckets, and I am convinced that bathing was very little practiced. In all the wards are earth-chambers sufficient in number for the use of all the patients, so that, were it not for the accidental discharge of fæces in the bed, which, in low cases of diarrhœa, so often occurs, even in the most careful of wards, there would probably be very few bad odors. I noticed a man, a poor Frenchman, who had just arrived, evidently very low, whose clothes were foul from recent discharges, which loaded the air with their exhalations, evidently not promoting the healthiness of the place.

Usually the bed-clothes were pretty clean; the hair mattresses were upon small iron-cot frames.

The Spanish also feed their patients in the wards, but, probably for lack of room, no tables are supplied, as at Bermuda.

I saw nothing worth copying in the whole institution—nothing which, added to our own, would improve the system. It is a great pity that so fine a situation should be abused by having built upon it a hospital that can derive no benefit from the fresh air so abundantly lavished upon it.

The trees and plants growing inside the walls I conceive to be very beneficial, not only as affording a pleasant shade from the direct rays of a tropical sun, but by their leaves also absorbing the poisonous organic exhalations which must necessarily arise within the inclosure.

The most objectionable feature about the institution to my mind is its crowded condition. This may be owing to the want of sufficient accommodation for a greatly-increased number of sick; but from what information I could gather, considering my limited acquaintance with the language, it is the usual condition, and, indeed, I should have supposed that during the summer a much greater number would need the assistance of the hospital than at this season, which is the healthiest of the year. I had no means of ascertaining the treatment pursued here. The medical attendants live in the city, and only visit the building twice daily. I therefore did not meet either of them. I think there were three attending physicians attached to the building. It is under the command of a lieutenant.

SANTIAGO PORT.

This port, long famous, or rather notorious, as being the most unhealthy in the island, has, in my opinion, every title to its notoriety, being the most filthy in every respect of all the cities or harbors I have hitherto visited.

The streets have every natural advantage for drainage, the city being built upon a hill several hundred feet high, and all the streets sloping gradually from its center to the water, which

surrounds it on nearly three entire sides. No sewers, however, exist. All the filth and offal, which a large city naturally accumulates, is thrown into the gutters, which are in a constant state of animal and vegetable decomposition, day and night. You can go upon no street, however aristocratic, but the most horribly putrescent odors greet you at every crossing. It is said that the contents of all sinks and water-closets are hauled out in carts and dumped into the water over the wharves. I do not know, but, judging from the intolerable stench that comes down the river at night, I am disposed to credit the statement. The water in the harbor is almost stagnant, there being a rise and fall of tide of about six inches to two feet, and the amount of water supplied by the river being very limited. I think it would be exceedingly unsafe to send a vessel of war into this harbor for any length of time, particularly in summer or autumn. Directly opposite the city, across the harbor, is a very extensive marsh of several thousand acres, which cannot but add to the unhealthiness of the station.

SANITARY REPORTS.

EUROPEAN SQUADRON.

1873.

EUROPEAN SQUADRON, 1873.

REPORT OF A. L. GIHON, M. D.,

Medical Inspector and Surgeon of the Fleet.

FLAG-SHIP WABASH.

HYGIENE.

Complement of officers and men, 660; actual number on board, 614–629.

Cubic air-space of gun-deck, 48,500 feet. Number of men sleeping on gun-deck, 380. Cubic air-space for each man on gun-deck, 129 feet.

Cubic air-space of berth-deck, 31,783 feet. Number of men sleeping on berth-deck, 180; cubic air-space for each man, 176 feet.

Cubic air-space of each forward-officer's room, 300 feet; of each steerage, 1,495 feet. Number of officers in steerage, 6 port and 7 starboard. Cubic air-space of each—port, 213 feet; starboard, 249 feet.

Cubic air-space of wardroom, 17,790 feet. Occupants of wardroom, 20 officers, 9 servants. Cubic air-space of each state-room, 275–325 feet.

Cubic air-space of each upper cabin, 3,900 feet; of lower cabin, 9,000 feet.

Percentage of sickness, 73.68 of complement; of mortality, 0.86 of admissions; 0.63 of complement.

Ventilation.—In pleasant weather at sea, and usually in harbor, the opened gun-deck ports afford an abundant supply of air and light; but when these are closed, and especially when the engine is in operation, and the hammocks of both watches

are below, the atmosphere of this deck is even more impaired than that of the berth-deck, where the number of sleepers is less than half, and where the wind-sails supply a greater amount of fresh air. When safety requires this closure, there can, of course, be no other remedy but to employ steam-ventilators, and to increase the air-space as much as possible by having the hammocks of only one watch below. The ventilation of the berth-deck is further effected in pleasant weather and in harbor by nineteen air-ports on each side, affording a total aperture of eleven and a half square feet. These are of the round-hinge pattern, and inferior to the larger square ports common in British vessels. The ship is well provided with wind-sails, but more attention is paid to keeping their heads on a symmetrical line than to their proper disposition below. Besides the permanent ventilators, which are too few and too small, there should be a number of rotary fan-ventilators provided, operated by steam or hand, for the frequent renewal of the air of the hold, store-rooms, and bilges. All the bulk-heads on the berth-deck have the common fault of being impermeable to air except in their upper panels.

Lighting.—The amount of light, as well as of air, will be beneficially augmented by the enlargement of ports suggested above.

Warming.—There are steam-coils in the cabin, wardroom, berth-deck, and sick-bay, which have only been used for drying the decks. I have found them objectionable as raising the temperature, and, consequently, increasing the point of saturation.

Water.—In consequence of the presence of cholera in many of the European ports, the only water used for drinking has been supplied by the condenser, which can supply two thousand gallons a day. This has been well aerated and palatable. The tank capacity is only eighteen thousand gallons.

Food.—The prominent defect in the naval ration, as issued

on board this ship, is the insufficient variety of vegetable food. The desiccated potatoes are insipid, and should be replaced by potatoes dried in slices. Tomatoes, sauer-kraut, &c., should form alternate parts of the ration. Fourteen ounces of bread are too little, since the morning issue of coffee, and the ration should be increased to twenty. In port men are accustomed to supply the lack of bread and vegetables from bum-boats, but especial facilities for purchasing and storing potatoes, turnips, onions, squash, &c., for use during long passages should be never omitted. On leaving Gibraltar for Key West, a large amount of live stock was taken on board for officers' messes; but, aside from the unwholesome character of the flesh of animals long at sea, the encroachment on the air-space and the additional element of uncleanness, are objections to this practice.

Clothing.—None of the clothing on board this ship has been water-proofed. The want of a light, loosely-fitting flannel jumper, to be worn in hot climates outside the undershirt, has been seriously felt. The Navy cap is too heavy for summer wear, and a skeleton duck cap with havelock should be substituted for it.

The sick-bay of the Wabash is only large enough for the proper accommodation of three cots. No objection, however, has ever been made to placing serious cases on the after part of the gun-deck.

The most serious sanitary defect in this vessel is the faulty construction of the bilges, which permits the accumulation of foul water under the port side of the wardroom, where it is inaccessible by the pumps. It has been removed every week by severe manual labor. Carbolic acid, sulphate of iron, and nitrate of lead have been used in large quantities after each cleansing. The repeated illness of the officers occupying the state-rooms on the port side of the wardroom has been un-

doubtedly due to the impure air discharged into their rooms from below.

The hygiene of this ship has been far above that of any other vessel within my experience, as corroborated by the moderate list of sick due to causes within the vessel. Instead of discussing, in this place, these minor faults, which are common to men-of-war, I beg to refer the Bureau to the little work, published by authority of the Navy Department, embodying certain "*Practical Suggestions in Naval Hygiene*," which represent, in detail, my opinions in this matter.

CLIMATOLOGY.

No instruments or blanks having been supplied, it has not been possible to collect satisfactory data under this head. The tables appended have been chiefly abstracted from the ship's log-book, but the observations are not believed to be of any scientific value. The records of the wet-bulb thermometer have been omitted as altogether unfit for hygrometric purposes.

MEDICAL TOPOGRAPHY, ETC.

On the 1st of June, 1873, I relieved Surgeon Albert C. Gorgas, in charge of the medical department of this vessel and as surgeon of the fleet on the European station. The Wabash was then in the French harbor of Ville Franche sur Mer, where she had been anchored since May 23. There were eight on the sick-list. Two patients transferred to the hospital St. Roch at Nice, prior to my arrival, died with pulmonary phthisis. This, the only hospital of the city, is well located, in an extensive building, where the patients are under the supervision of Sisters of Charity. I was repeatedly promised details of the *personnel* and administration of this establishment, but never received them. The course of treatment, however, pursued in the cases of the men referred to determined me not to send any other of the sick in the fleet to this place. Although in advanced stages

of the disease, they were repeatedly blistered, fed on thin broths, and denied wine, brandy, generous food, &c., necessary in the treatment of such cases.

The city of Nice, of which Ville Franche is a sea-port, has a wide reputation as a winter-residence for pulmonary invalids, but during the period of my own stay there (November 15 to 23) it was frequently visited by heavy rains and cold winds, sweeping down from the Maritime Alps, which overlook it. The *mistral* or northwest wind is especially insalubrious. Sudden transitions of temperature, at every season of the year, are very common, and it is considered absolutely necessary for even healthy visitors to secure apartments with a southern exposure. From 4 to 7 o'clock p. m. a sudden fall of temperature compels almost every one to remain within doors, due, as I observed when off the port, to a dense mist settling upon the valley of the Paillon, within which the city is located, and completely enveloping it. The mean annual temperature of Nice is 60°, while that of Rome is 61°, Madeira 66°, and Orotava, 68°.5, to the latter of which places it is inferior in every respect as a sanitary resort.

The Italian ports of Genoa, Palermo, Messina, and Syracuse were visited during the month of June, but the stay at each did not exceed three days. The climate was that of the Mediterranean summer, the thermometer ranging from 64° to 83°, without rain and with a scarcely varying barometer. Only forty-nine unimportant cases were admitted to treatment during the entire month. At all these places there was the same immunity from venereal disease as in French ports. The Italian regulations on this point are very stringent, heavy fines being imposed on women complained of for communicating disease. In Syracuse the inspection of prostitutes is conducted by Sisters of Charity, who thus have an opportunity of attempting to dissuade them from their calling.

The Wabash arrived at Trieste on the 6th of July, and remained until the 21st. The amount of sickness was trifling, the list having been reduced to five. Subsequently a number of syphilitics reported, which date from this place, where sanitary inspections are required, but negligently conducted. The large number of foreign sailors in this port partly accounts for the prevalence of venereal affections, since there is no protection of the women from the visits of diseased men. The hospitals at Trieste are unworthy of the place. I had great difficulty in obtaining proper accommodations for a young midshipman affected with acute mania. The insane hospital was unclean, the patients neglected, and subjected to restrictive measures calculated to aggravate their condition. I finally secured a private apartment in the civil hospital, where he was placed in charge of our own people and visited by the medical officers of the Wabash and Guard. Ineffectual attempts were made by Dr. Winslow to obtain data of the organization, &c., of this hospital, but the only copy of the annual report was mislaid, and the attendants did not seem to possess the information.

The rumored occurrence of cholera in Northern Italy and Southern Austria hastened our departure and secured us an absurd and formal quarantine of four days at Corfu, although there were but three cases at the time on our sick-list, and although the passage of four days from Trieste was itself a sufficient quarantine, and although no drinking-water, the only recognized means of communicating the disease, had been taken on board.

I had no opportunity of personally verifying the existence of cholera, either in Trieste, Vienna, Pesth, or Venice. At the latter city I visited the "Ospedale civile generale," an extensive establishment, containing 1,080 patients, with a capacity for 1,350, and was assured there had not been a case under treatment. This hospital may be taken as a type of the best in

Italy. The *personnel* consists of ten professors, sixteen assistants, twenty nuns, five friars, six apothecaries, and one nurse for every ten patients; but at the period of my visit, no one of the medical staff was in the building, and I was only able to obtain a few meager items of information from an attendant speaking an Italian patois, I could not well understand. I have remarked the same absence of medical residents in other European hospitals which I have visited. Throughout Italy and Spain suppressed religious establishments have been appropriated for hospitals, as well as other public buildings; and in temperate climates, where a sufficient supply of fresh air is obtained through the opened doors and windows, the wide and lofty corridors and uncovered courts, they are satisfactory temporary expedients. Whitewashed walls and tiled or stone floors are easily kept clean, while the number of apartments permits a proper classification of inmates, and should obviate the overcrowding which economy of attendance has instituted. The cubic air-space per patient in this hospital was, however, far below the recognized minimum. Until a few days prior to my visit, it had been further inconvenienced by a large number of insane inmates. One hundred and forty of these had been transferred to the "Sacramento," intended exclusively for this class. Several hundred, a majority females, still remain, and a large proportion of these were manacled or strapped to beds and chairs. The unclean and haggard condition of these patients, as at Trieste, not one of whom exhibited any evidence of furious mania, was highly discreditable.

I found, however, much to admire in this hospital in other respects. The wards were clean and orderly, with a notable absence of any hospital odor. The store-rooms were commodious and convenient. The kitchen was fitted with marble tables and scrupulously clean. Ample bathing-facilities were afforded by thirty-six marble baths in separate rooms, supplied

with hot and cold, fresh and salt water. The anatomical room was admirably arranged with revolving marble tables, and could not have been less offensive nor better adapted for its purpose. The attendant was then engaged in making preparations of a number of vertebral columns and pelves, badly deformed from caries, and obtained from patients who had recently died during parturition.

The admirable pharmacy of the hospital was under the superintendence of Signor Pietro di Cian, capopharmacisto, who is devoting himself to the preparation of gelatine tablets, a method of compounding and administering medicines suggested by Professor Almen, of Upsala, as a substitute for the pilular form. I transmit herewith a number of specimens of drugs prepared by this method.

While at Vienna I visited, as thoroughly as my short stay would permit, the medical department of the Welt-Austellung, and beg to refer to my report to the commander-in-chief, dated July 24, for some details respecting the exhibition of the "Société de secours aux militaires blessés."

The Wabash remained at Corfu, the sea-port capital of the island of the same name, from July 25 to August 5. The city is situated in a valley on the north coast of the island, protected by high land from the influence of the African sirocco. During our stay the thermometer ranged on board from 77° to 87°, a temperature several degrees less than on shore. It has seldom, however, exceeded 94°. Frost is unknown during the winter, which is so equable that, during the British occupancy, it became a favorite resort for English consumptives. Miasmatic diseases of a mild type prevail in the vicinity of the marsh-land outside the city, but I was assured by a leading practitioner that there are no diseases characteristic of the place. The water, as in many other European cities, is charged with lime-salts, but rain is collected and drunk. There are several

small hospitals at Corfu, civil and military, besides that for the insane of the whole kingdom of Greece, and one for foundlings. In the latter, the wise course of rearing the children in the country has been adopted, with a large abatement of the high rate of mortality customary in these institutions. Prostitutes are examined, but the regulations are lax, and a number of troublesome cases contracted at this port came under treatment.

The flag-ship, having been recalled from the east on account of the civil war in Spain, anchored, August 14, in Escombreras Bay, near Carthagena, remaining until the 28th. The temperature ranged from 78° to 90°, but the sick-list rarely exceeded ten or twelve. No communication was had with the place on account of its occupation by the insurgents, and on the 31st she arrived at Barcelona, in which port she remained until October 27, when she returned to Ville Franche, to be summoned by telegraph to the United States, November 23. The sick-list, during this time, had risen from ten to thirty, of which more than half were obstinate cases of venereal disease.

The city of Barcelona, in common with other Spanish places, suffers the evils of a totally-neglected hygiene. Its authorities vainly attempt to shut out disease by annoying and absurd quarantines, while they ignore the noisome stenches which assail them at every corner. Those from the street-urinals are, in warm weather, especially offensive. A former municipal regulation required every householder to clean the street before his dwelling, but this is now disregarded, and the absence of sewerage renders the narrow streets of the old city filthy and unwholesome. Al hough several times scourged by epidemics, it is difficult to convince the people that these have arisen among themselves. The city cess-pools are now emptied into air-tight cylinders, which, however, discharge their contents on the beach just outside the city limits.

Besides the diseases induced by neglected hygiene, I learned from a resident physician, of many years' experience, that progressive locomotor ataxia and other affections of the nervous system predominated, ascribing the former to the custom of living in elevated apartments, requiring the laborious ascent and descent many times a day of the lofty stone stair-ways leading to them; but a more rational explanation is doubtless to be had in the excessive tax upon the nervous system through the peculiar modes of sexual excitation here so common.

The terrible venereal diseases, which have been almost banished from France, Portugal, and Italy by their excellent and unexceptionable systems of sanitary inspection of "*femmes enregistrées*," are here entirely unchecked, and while our sick-lists in ports of those other nations only exhibited an occasional gonorrhea or chancroid, here a large proportion of indurated chancres were developed among the men, followed during the ensuing month by the usual train of constitutional sequelæ. As all attempts at the eradication or prevention of these diseases by the examination of women require the co-operation of parties having access to them, I suggested to the commander-in-chief, on our return to France, the propriety of confining every diseased man on board ship; to which he immediately assented by the following orders:

Enlisted men will not, hereafter, be allowed to go on shore, on this station, either on duty or on liberty, until they have been examined by a medical officer and pronounced unaffected by any communicable disease.

Medical officers will make a special report to the surgeon of the fleet, at the end of each quarter, of all cases of venereal diseases discovered aboard the several vessels, specifying the characteristics, duration, and sequelæ of each, with the time and place of infection, as far as ascertainable, and all such cases, whether regularly entered on the sick-list and excused from duty or not, shall be kept under supervision until reported by the medical officers completely cured.

Barcelona is deficient in charitable institutions. With a

population of two hundred thousand, there are but two hospitals, one for the sole use of the large force of troops maintained here; the other, the Hospital of Santa Cruz, for the general populace. Both are located in suppressed convents. The former has about two hundred and fifty inmates, with a capacity for six hundred; the latter about seven hundred, crowded in a number of wards communicating with each other by wide door-ways, the patients being closely ranged in two rows of beds along both walls of the apartment. There was no attempt at isolation of contagious diseases. As I walked through the double rows of beds, I observed several severe cases of confluent variola, which were side by side with diseases of a totally different character. The hospital was so manifestly unsuited for its purposes, that I was compelled to place a patient with angina pectoris and epileptiform convulsions, requiring perfect quiet, in a room in the principal hotel.

My absence from the flag-ship on leave compelled me to detail the duty of collecting most of the data of the third portion of the sanitary report to my colleagues, Passed Assistant Surgeons Winslow and Ruth, and I append herewith two detailed reports by Dr. Ruth.

Meteorological register.

[United States flag ship Wabash, 1st rate.—Nice, France.—Latitude, 43° 40′ N.; Longitude, 7° 20′ E.]

Date.	Barometer.				Thermometer, attached.				Thermometer, detached.				Wind.				Rain.		
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Began.	Ended.	Quantity.
1873.					°	°	°	°	°	°	°	°							
May 23	..	30.12	30.10	30.11	..	66	70	69	....	68	71	69	.....	W.	Calm.	Calm.	0	0	0
24	30.02	30.02	30.01	30.01	65	68	71	71	65	72	71	69	Calm.	E. by S.	S.	Calm.	0	0	0
25	30.00	30.04	30.09	30.10	70	71	73	72	75	79	79	75	Calm.	Calm.	S.	Calm.	0	0	0
26	30.15	30.15	30.19	30.16	72	73	74	73	78	77	77	74	Calm.	S. E.	E.	Calm.	0	0	0
27	30.10	30.04	29.93	29.95	68	70	78	70	69	72	79	69	S. W.	Calm.	S. W.	S. W.	3 a. m	7 a. m	M.
28	29.93	29.97	29.98	29.96	69	71	72	69	75	78	73	68	S. E.	S.	S. E.	N. E.	4 p. m	9 p. m	Heavy.
29	30.05	30.09	30.09	30.05	69	70	71	71	69	73	76	72	Calm.	S.	S. W.	S. E.	0	0	0
30	30.01	30.02	30.02	30.00	68	69	71	71	70	76	74	72	E.	S. E.	S. E.	S. E.	0	0	0
31	29.96	29.96	29.89	29.96	69	70	69	68	68	70	71	66	S. E.	S.	E.	S. E.	0	0	0
June 1	30.01	30.05	30.05	30.05	66	68	68	67	66	69	70	66	S. E.	S. W.	S. E.	Calm.	0	0	0
2	30.10	30.11	30.10	30.05	66	67	70	70	66	70	70	69	S. E.	E.	E.	Calm.	8 p. m	12 p. m	Drizzly.
3	30.08	30.10	30.10	30.07	68	70	72	71	70	73	76	74	Calm.	S. E.	E. S. E.	S. E.	0	0	0
4	30.04	30.04	30.02	30.01	72	72	73	72	76	80	74	73	S. E.	V'ble.	E.	E.	4 p. m	12 p. m	Drizzly.
5	30.06	30.09	30.11	30.10	70	73	73	72	71	74	75	72	V'ble.	S.	E.	S.	0	0	0
6	30.07	30.06	30.04	29.99	69	69	69	67	69	69	70	69	Calm.	S. E.	S. E.	V'ble.	0	0	0
7	29.94	29.93	29.90	29.84	67	70	72	69	69	72	75	72	Calm.	S.	S. E.	V'ble.	0	0	0
8	29.93	29.95	29.94	29.95	70	71	69	69	70	71	70	69	S.	E.	E.	S. W.	8 a. m	12 a. m	Drizzly.
9	30.00	30.06	30.10	30.10	69	69	70	69	70	71	73	70	E.	E.	S. E.	Calm.	0	0	0
10	30.14	30.17	30.13	30.10	69	69	72	70	71	72	74	71	Calm.	S. E.	E.	E.	0	0	0
11	30.06	30.02	30.01	29.97	69	69	70	69	70	71	71	69	Calm.	E.	N. W.	N. W.	12 p. m	4 p. m	Slight.
12	29.88	29.85	29.86	.....	69	70	69	.....	68	70	70	.....	Calm.	W. S. W	S. W.	.....	12 p. m	4 p. m	Slight.
Mean ..	30.01	30.04	30.03	30.03	68.8	69.8	70.8	69.9	70.2	72.7	73.3	70.4							

Extreme range of barometer, 29.85–30.19. Extremes of temperature, 65°–80°. Number of days rain, 7.

Meteorological register.

[United States flag-ship Wabash, 1st rate.—Trieste, Austria.—Latitude, 45° 39′ N.; Longitude, 13° 46′ E.]

Date.	Barometer.				Thermometer, attached.				Thermometer, detached.				Wind.				Rain.		
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Began.	Ended.	Quantity.
1873.					°	°	°	°	°	°	°	°							
July 6	.....	.....	.....	30.13	.....	.....	.....	84	.....	.....	.....	82	.....	.....	.....	Calm.	0	0	0
7	30.18	30.19	30.20	30.18	79	79	80	81	80	80	80	81	Calm.	Calm.	N.	V'ble.	0	0	0
8	30.21	30.20	30.18	30.17	76	79	83	82	77	84	85	80	S. W.	N.	W.	W.	0	0	0
9	30.11	30.18	30.12	30.12	80	78	85	80	79	85	87	79	S. E.	V'ble.	N. W.	V'ble.	6 p. m	9 p. m	Heavy.
10	30.13	30.12	30.10	30.10	75	79	83	84	77	80	87	85	N. E.	Calm.	V'ble.	V'ble.	0	0	0
11	30.09	30.10	30.12	30.11	77	79	85	86	80	85	87	80	Calm.	V'ble.	N. W.	N. W.	0	0	0
12	30.12	30.11	30.10	30.10	79	82	79	81	81	85	86	82	Calm.	Calm.	N. W.	Calm.	0	0	0
13	30.08	30.09	30.07	30.05	79	80	78	80	82	83	78	82	E.	S. E.	S. E.	Calm.	11 a. m.	3 p. m.	Heavy.*
14	30.08	30.08	30.08	30.05	77	80	80	79	79	81	84	83	Calm.	S. W.	W.	Calm.	0	0	0
15	29.94	29.94	29.98	30.02	78	80	82	79	80	81	84	81	N. E.	S. W.	W.	V'ble.	6 a. m	8 a. m.	Slight.
16	*76.35	*76.45	*76.55	30.11	71	78	80	80	73	79	80	80	E.	E. N. E.	E. S. E.	E.	0	0	0
17	30.23	30.24	30.30	30.30	72	72	83	76	76	78	83	80	E.	E. N. E.	E.	E.	0	0	0
18	30.32	30.30	30.25	30.18	74	79	82	80	76	79	83	80	E.	E. by N.	W.	V'ble.	0	0	0
19	30.08	30.06	29.98	29.98	80	81	81	69	78	82	81	70	Calm.	S. E.	N. W.	N. E.	4 p. m	8 p. m	Slight.
20	30.07	30.14	30.13	30.15	70	72	75	75	71	73	76	75	N. E.	N.	N. W.	E.	0	0	0
21	30.04	30.13	30.10	.....	72	75	76	.....	73	75	78	.....	S. E.	Calm.	N. W.	.....	0	0	0
Mean ...	30.12	30.13	30.12	30.12	75.9	78.2	80.8	79.5	77.5	80.7	82.6	80							

Extreme range of barometer, 29.94–30.32. Extremes of temperature, 71°–87°. Number of days rain, 4.

* Aneroid. † Accompanied with hail.

Meteorological register.

[United States dispatch ship Wabash, 1st rate.—Carthagena, Spain. Latitude, 37° 36′ N.; longitude 1° 1′ W.]

Date.	Barometer.			Thermometer, attached.			Thermometer, detached.			Wind.			Rain.		
	9 a. m.	3 p. m.	Sunrise.	9 a. m.	3 p. m.	Sunrise.	9 a. m.	3 p. m.	Sunrise.	9 a. m.	3 p. m.	Sunrise.	9 a. m.	3 p. m.	Sunrise.
1871.															
Aug. 14	30.16	30.14	30.08	82	82	77	82	82	77	Calm	Calm	Variable			
15	30.10	30.10	30.04	82	82	77	82	82	77	NW.	NW.	NW.			
16	30.13	30.11	30.02	82	82	77	82	82	77	NW.	NW.	NW.			
17	30.07	30.03	29.94	82	82	77	82	82	77	NW.	NW.	NW.			
18	30.01	29.97	29.91	82	82	77	82	82	77	NW.	NW.	NW.			
19	30.02	30.00	29.94	82	82	77	82	82	77	NW.	NW.	NW.			
20	30.04	30.02	29.97	82	82	77	82	82	77	NW.	NW.	NW.			
21	30.04	30.02	29.97	82	82	77	82	82	77	NW.	NW.	NW.			
22	30.04	30.02	29.97	82	82	77	82	82	77	NW.	NW.	NW.			
23	30.04	30.02	29.97	82	82	77	82	82	77	NW.	NW.	NW.			
24	30.04	30.02	29.97	82	82	77	82	82	77	NW.	NW.	NW.			
25	30.04	30.02	29.97	82	82	77	82	82	77	NW.	NW.	NW.			
26	30.04	30.02	29.97	82	82	77	82	82	77	NW.	NW.	NW.			
27	30.04	30.02	29.97	82	82	77	82	82	77	NW.	NW.	NW.			
28	30.05	30.03	29.96	82	82	77	82	82	77	NW.	NW.	NW.			
Mean ...	30.01	29.99	29.93	82	82	77	82	82	77						

Extreme range of barometer, 29.91–30.16. Extremes of temperature, 76° 90°. Number of days rain, 3.

Meteorological register.

[United States flag-ship Wabash, 1st rate.—Barcelona, Spain.—Latitude, 41° 23′ N.; Longitude, 2° 11′ E.]

Date.	Barometer.				Thermometer, attached.				Thermometer, detached.				Wind.				Rain.		
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Began.	Ended.	Quantity.
1873.					°	°	°	°	°	°	°	°							
Sept. 1	30.00	30.00	29.92	29.92	74	74	80	78	75	75	80	78	N. W.	W.	S. S. W.	Calm.	0	0	0
2	29.91	29.92	29.93	29.95	77	78	76	75	78	78	78	78	V'ble.	S.	E. S. E.	S. E.	0	0	0
3	29.95	29.97	29.99	30.00	75	76	74	75	77	77	76	76	Calm.	S. E.	S. E.	S. E.	0	0	0
4	30.00	30.03	30.03	30.01	73	73	73	72	75	75	79	73	N.	N.	S. E.	N. E.	10 p. m	12 p. m	M.
5	29.91	29.96	29.91	29.88	69	68	79	74	68	67	72	70	N. E.	N. W.	S. E.	S. E	12 a. m 9 p. m	11 a. m 11 p. m	M. M.
6	29.77	29.75	29.75	29.80	68	68	69	69	69	67	65	65	E.	E.	N.	N. E.	12 a. m	12 p. m	M.
7	29.89	29.92	29.99	30.04	67	68	71	69	65	66	71	68	Calm.	Calm.	S. W	S W.	12 a. m	6 a. m	M.
8	29.99	29.99	29.96	29.94	70	71	74	71	68	71	76	73	W.	W.	S. W.	N. E	10 p. m	12 p. m	Drizzly.
9	30.03	30.07	30.09	30.08	71	70	74	72	71	73	76	74	N. E.	N. W.	S. W.	V'ble.	0	2 a. m	Drizzly.
10	30.09	30.10	30.11	30.12	72	72	74	75	71	73	79	76	Calm.	Calm.	S. W.	N.	0	0	0
11	30.12	30.13	30.07	30.04	73	73	76	75	72	73	78	74	Calm.	Calm.	S. W.	S. W.	0	0	0
12	30.03	30.03	29.98	29.94	75	75	76	75	74	75	81	75	Calm.	S. W.	S. W.	S. W.	0	0	0
13	29.92	29.91	29.92	29.92	72	73	76	77	74	76	78	78	N. E.	S. E.	S. E.	S.	0	0	0
14	29.81	29.85	29.79	29.99	74	76	75	74	75	76	76	75	S.	S.	N. W.	W.	4 a. m	1 p. m	M.
15	30.00	30.01	29.95	29.94	72	72	73	74	67	69	75	73	N. W.	N. W.	W.	N. W.	0	0	0
16	30.02	30.04	30.04	30.06	71	71	77	70	68	68	78	70	V'ble.	V'ble.	S. E.	S. W.	1 a. m	4 a. m	Slight.
17	30.09	30.09	30.08	30.10	70	74	75	76	67	69	78	76	N. W.	N. W.	S. W.	N.	0	0	0
18	30.10	30.11	30.07	30.06	75	75	76	75	70	73	76	75	N E.	N. E.	V'ble.	E.	0	0	0
19	30.14	30.16	30.09	30.12	73	74	76	73	73	74	76	72	S. W.	S. W.	S. W.	Calm.	0	0	0
20	30.12	30.12	30.09	30.09	73	75	75	75	71	74	76	74	Calm.	S.	S. W.	V'ble.	0	0	0
21	30.07	30.10	30.13	30.12	73	74	74	74	72	74	74	74	N.	S. E.	S. E.	Calm.	0	0	0
22	30.09	30.09	30.09	30.00	73	74	76	74	71	73	75	74	N. E.	N. E.	S. E.	N. W.	0	0	0
23	30.00	30.00	29.99	29.95	72	72	75	74	70	71	80	73	N. W.	Calm.	S. E.	S. E	0	0	0
24	29.98	29.95	29.90	29.92	70	72	75	75	71	73	77	75	Calm.	S. W.	S. W.	S. W.	0	0	0
25	30.01	30.03	30.06	30.06	72	74	75	74	72	74	76	73	N. E.	E.	S. E.	N.	0	0	0
26	30.05	30.06	30.08	30.08	72	72	75	73	69	72	76	71	V'ble.	S. E.	S. S. W.	S. W.	0	0	0
27	30.03	30.04	30.07	30.05	71	75	69	74	69	70	71	72	E.	S. E.	N. E.	Calm.	2 a. m	4 p. m	M.
28	30.05	30.02	30.03	30.01	73	75	75	73	68	70	79	73	Calm.	N. E.	S. E.	E.	0	0	0
29	29.97	29.98	30.03	30.05	71	71	72	72	71	72	76	73	Calm.	V'ble.	S. W.	S. W.	0	0	0
30	30.00	30.01	30.04	30.04	73	73	74	73	74	74	78	75	V'ble.	S. W.	S. W.	Calm.	1 a. m	11 a. m.	Slight.
Mean ...	30.00	30.01	30.00	30.00	72.1	72.9	74.6	73.7	71.2	72.4	78.5	74.2							

Extreme range of barometer, 29.75–39.13. Extremes of temperature, 65°–81°. Number of days rain, 10.

[United States flag-ship Wabash, 1st rate.—Barcelona, Spain.—Latitude, 41° 23′ N.; Longitude, 2° 11′ E.]

Date.	Barometer.				Thermometer, attached.				Thermometer, detached.				Wind.				Rain.		
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Began.	Ended.	Quantity.
1873.					°	°	°	°	°	°	°	°							
Oct. 1	30.05	30.08	30.10	30.10	71	72	72	72	72	73	74	74	Calm.	Calm.	S. W.	S. W.	0	0	0
2	30.10	30.12	30.13	30.11	72	72	72	72	70	73	76	72	N. E.	V'ble.	S. W.	V'ble.	0	0	0
3	30.07	30.07	30.07	30.06	71	71	73	72	73	74	80	75	Calm.	N. E.	S. W.	S. W.	0	0	0
4	30.04	30.03	30.01	29.95	71	72	74	73	71	74	76	73	Calm.	N. E.	S. E.	N. E.	0	0	0
5	29.95	29.96	30.03	30.01	69	74	74	73	72	73	72	73	N.	N. E.	S. W.	Calm.	7 a. m	9 p. m	Slight.
6	30.11	30.10	30.09	30.06	72	72	74	72	72	73	75	73	S. E.	S. E.	S. E.	E.	0	0	0
7	30.02	30.01	29.97	29.94	74	74	76	74	72	72	76	72	N.	N. E.	V'ble.	Calm.	0	0	0
8	29.81	29.80	29.81	29.83	73	73	75	74	71	73	76	71	Calm.	N. W.	N.	S. E.	10 a. m	11 p. m	M.
9	29.86	29.90	29.86	29.88	69	70	69	65	61	64	67	65	N. E.	V'ble.	N. W.	N. W.	0	0	0
10	29.89	29.92	29.95	30.02	65	64	74	63	62	61	69	63	N. W.	V'ble.	V'ble.	E. by N.	10 a. m	10 p. m	M.
11	30.03	30.06	30.08	30.06	73	74	69	68	63	64	73	68	V'ble.	N. E.	N. E.	Calm.	1 a. m	5 a. m	M.
12	29.96	29.95	29.91	29.92	68	68	69	69	62	62	73	69	N.	E.	E.	N. W.	0	0	0
13	29.85	29.85	29.84	29.80	67	67	71	69	66	67	72	71	V'ble.	V'ble.	S. E.	V'ble.	0	0	0
14	29.85	29.85	29.82	29.82	69	70	69	68	68	69	71	69	V'ble.	V'ble.	E.	N. E.	9 p. m	12 p. m	Heavy.
15	29.75	29.76	29.78	29.78	67	67	66	66	67	66	67	64	N. E.	E.	E. N. E.	N. E.	4 a. m	11 p. m	M.
16	29.69	29.69	29.69	29.70	65	64	65	66	65	64	66	66	N. N. W	N. W.	W.	S. S. W.	1 a. m	12 m'n't	M.*
17	29.81	29.85	29.83	29.88	62	62	68	67	62	62	67	64	N. N. W	N. W.	W.	N. W.	1 a. m	10 p. m	Slight.
18	29.82	29.85	29.92	30.00	67	65	68	67	62	61	67	62	N. W.	N. W.	N. E.	N.	3 p. m	8 p. m	M.
19	29.95	30.00	30.00	29.99	66	65	66	66	60	63	66	65	N. W.	N. W.	Calm.	W.	10 a. m	11 a. m	Drizzly.
20	29.99	30.01	29.97	30.02	64	63	66	64	59	60	68	64	N. W.	N. W.	W.	W. S. W	0	0	0
21	29.93	29.90	29.94	29.96	63	64	67	65	60	63	67	62	N. W.	N. E.	S. W.	S.	0	0	0
22	29.87	29.97	29.95	29.93	63	64	66	66	67	64	69	63	N. W.	S. W.	S. W.	Calm.	0	0	0
23	29.94	29.85	29.71	29.70	65	63	70	67	61	64	69	66	Calm.	S. W.	S. W.	N. E.	0	0	0
24	29.57	29.52	29.46	29.55	66	67	68	66	63	67	69	64	Calm.	W. S. W	W. S. W	W.	4 p. m	6 p. m	M.
25	29.62	29.62	29.60	29.70	66	65	66	64	57	59	63	60	W. N. W	N. W.	N. W.	S. W.	0	0	0
26	29.78	29.88	29.93	29.98	64	66	68	65	55	55	67	57	N. W.	N. W.	S. W.	N. W.	0	0	0
27	30.00	30.02	29.97	.....	62	63	64	.....	54	58	62	.....	N. E.	N. E.	E. by N.	.....	0	0	0
Mean ...	29.94	29.91	29.94	29.91	67.4	67.7	69.5	68.2	64.7	65.9	70.2	67.1							

Extreme range of barometer, 29.46–30.13. Extremes of temperature, 54°–80°. Number of days rain, 11.
*** Rained all day.**

Meteorological register.

[United States flag-ship Wabash, 1st rate.—Nice, France.—Latitude, 43° 40′ N.; Longitude, 7° 20′ E.]

Date.	Barometer.				Thermometer, attached.				Thermometer, detached.				Wind.				Rain.		
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Began.	Ended.	Quantity.
1873.					°	°	°	°	°	°	°	°							
Nov. 1	29.85	29.90	29.85	29.87	53	56	64	57	54	57	61	57	W. S. W	Calm.	S. W.	N. W.	0	0	0
2	29.84	29.82	29.70	29.75	59	62	68	60	59	62	62	57	N. E.	S. S. E.	S. E.	V'ble.	8 a. m	12 p. m	Slight.
3	29.72	29.66	29.59	29.61	57	59	61	60	58	57	59	58	V'ble.	N. E.	S. W.	S. E.	12 a. m	9 p. m	Heavy.
4	29.78	29.82	29.83	29.87	58	59	64	59	57	59	63	58	S. E.	E. S. E.	E. S. E.	N. E.	3 a. m	7 a. m	Slight.
5	29.90	29.91	29.87	29.86	57	63	67	60	57	63	64	60	N. E.	N. E.	S. W.	N. W.	0	0	0
6	29.77	29.77	29.78	29.84	56	60	66	58	55	58	65	56	N. E.	N. W.	S. W.	W.	2 a. m	6 a. m.	Slight.
7	29.95	30.00	30.01	30.09	54	56	65	62	54	55	65	60	W.	N. W.	S. W.	W.	0	0	0
8	30.09	30.08	30.03	29.97	60	60	60	63	59	60	59	63	S. E.	S. S. E.	E. N. E.	V'ble.	4 a. m	12 p. m.	M.
9	29.97	30.00	29.98	29.98	63	65	64	60	64	63	61	59	S. S. E.	N. E.	S. E.	S. W.	4 a. m	12 p. m.	Heavy.
10	29.98	29.97	29.90	29.89	60	63	66	60	59	60	64	59	N.	N. W.	E. N. E.	S. E.	12 a. m.	8 a. m	Slight.
11	29.90	29.92	29.94	30.01	58	62	62	57	58	61	63	58	N. E.	N.	E. S. E.	S. E.	0	0	0
12	30.05	30.10	30.08	30.11	55	57	58	55	54	57	59	56	N. E.	E. N. E.	S. E.	N.	0	0	0
13	30.10	30.09	29.98	29.94	54	57	64	62	55	57	63	62	N. W.	N. W.	S.	S.	8 p. m.	12 p. m.	Slight.
14	29.78	29.79	29.73	29.72	62	61	64	60	61	60	62	59	V'ble.	V'ble.	E. S. E.	N.	1 a. m	10 a. m.	M.
15	29.72	29.74	29.76	29.84	60	62	66	62	60	61	63	61	Calm.	Calm.	N. N. E.	N. W.	0	0	0
16	29.87	29.91	29.88	29.95	59	66	66	62	59	67	65	62	N. by W	Calm.	S. W.	S. E.	0	0	0
17	30.09	30.14	30.10	30.11	57	57	60	55	57	57	59	56	E.	N. E.	S. E.	N. W.	0	0	0
18	30.08	30.09	29.98	30.00	53	55	63	58	54	55	62	57	N.	N. W.	Calm.	N. N. E.	0	0	0
19	30.03	30.05	30.04	30.03	56	59	63	58	56	60	61	58	N.	Calm.	N. W.	N. E.	0	0	0
20	30.03	30.03	30.01	30.03	55	58	65	56	55	58	61	57	Calm.	S. E.	S. E.	N. E.	0	0	0
21	30.01	30.03	29.97	29.95	58	57	64	56	58	58	63	57	N.	N. E.	Calm.	N.	0	0	0
22	29.84	29.82	29.69	29.54	54	55	59	54	54	55	58	55	N. E.	N.	N. W.	N.	0	0	0
23	29.60	29.66	29.63	.....	56	59	64	.....	56	58	63	.....	N. W.	W.	S. E.	.....	0	0	0
Mean ...	29.91	29.93	29.88	29.91	57.1	59.4	63.6	58.8	57.1	59.0	62.0	58.4							

Extreme range of barometer, 29.54-30.11. Extremes of temperature, 54°-67°. Number of days rain, 9.

Record of temperature at Barcelona, Spain.

[Kept by Henry Ruggles, esq., United States consul.]

Month.	Aggregates.	8 a. m.	Noon.	6 p. m.	9 p. m.	Days rain.
		°	°	°	°	
February, 1872	Maximum	58	71	69	.....	Five.
	Minimum	46	59	54	.....	
	Mean	52.5	65	61.5	.....	
November, 1872	Maximum	60	58	64	62	Two.
	Minimum	44	52	48	48	
	Mean	52	55	56	55	
December, 1872	Maximum	58	70	62	60	Four.
	Minimum	44	56	50	46	
	Mean	51	63	56	51.5	
January, 1873	Maximum	54	68	60	58	No record.
	Minimum	46	56	50	48	
	Mean	50	62	55	53	
February, 1873	Maximum	56	68	60	58	One.
	Minimum	40	44	46	42	
	Mean	48	56	53	50	
March, 1873	Maximum	64	72	64	60	Two.
	Minimum	54	62	58	56	
	Mean	59	67	61	58	

Meteorological register.

[Kept at St. Thomas, Danish West Indies.]

Date.	Barometer.	Temperature.		Rain.
		Max.	Min.	
		°	°	
Saturday, December 13*	30.125	84.5	71.0	Showers.
Monday, December 15	30.120	85.0	70.5	
Tuesday, December 16	30.118	85.5	70.5	
Wednesday, December 17	30.070	84.0	69.5	
Thursday, December 18	30.056	84.5	69.5	Slight showers.
Friday, December 19	30.042	81.5	68.0	
Saturday, December 20	30.076	83.0	68.0	
Monday, December 22	30.141	83.0	70.5	
Tuesday, December 23	30.125	84.0	67.5	
Wednesday, December 24	30.070	84.5	70.0	
Saturday, December 27	30.104	82.5	74.5	Slight rain.
Mean	30.095	83.8	69.9	

* December 7 to 14, rain-fall .020 inch; December 14 to 21, rain-fall .043 inch.

REPORT OF M. L. RUTH, M. D.,

Passed Assistant Surgeon U. S. Navy.

FLAG-SHIP WABASH.

ISLAND AND CITY OF CORFU.

CORFU, *August* 5, 1873.

SIR: I have the honor to report that I have made a careful investigation of the sanitary condition, &c., of the island and city of Corfu, and beg leave to report as follows:

Owning to the situation of the city, its surrounding of hills and its northerly exposure, it is to a certain extent protected from the intensity of the siroccos blowing from the coast of Africa, but it is at the same time debarred from the westerly winds. This peculiarity of position gives it an almost uniform degree of temperature during the winter and summer months. A temperature of from 89° to 94° Fahrenheit prevails during what is called the hot season, and an elevation above 94° is considered exceptional.

The fall and winter months are mild. Frost is unknown, and the uniform temperature of the days and nights fits it especially for those who suffer from lung complaints. The number of sick in the city is comparatively small. I could neither obtain the register of those sick nor of the deaths, but from the information given me I conclude that the death-rate is less than fifteen per thousand. The little sickness is due not only to the situation and climate of the city, but also to the temperance and morality of the people. The proportion of persons of advanced age is greater than is ordinarily seen.

The prevailing diseases are those due to miasmatic causes and the ordinary continued fevers. Epidemics of cholera, yellow fever, small-pox, &c., are rare; it having been many years

since any of these scourges have visited the island. The children are remarkably healthy. Ophthalmia, so prevalent on the coasts of Egypt and Turkey, is here rarely seen. I noticed several cases of fistula lachrymalis, but these seemed to have been produced by neglect.

The municipality have provided several hospitals for the treatment of the sick. Besides these, there is a military hospital, a hospital for the insane, and a foundling-hospital. In the civil and military hospitals there are not more than twenty cases, and these of ordinary and not serious diseases.

The insane-hospital receives all the pauper insane from all parts of Greece. Notwithstanding its national character, the number of its inmates is small.

In the foundling-hospital the infants are received without question, and as soon as it is deemed practicable they are sent to the country in care of competent nurses. By this means the mortality is much less than it is in those hospitals where the children are reared without this advantage.

The water drunk in the town is derived from mountain springs, and is heavily laden with the salts of lime, principally the carbonate. There seems, however, to be no deleterious effects from its use, but for cooking purposes an addition of carbonate of soda is required.

The people of Corfu are mixed English, Greek, and Turkish blood. They are cleanly in their habits, and, among the upper classes, moral. Prostitution is legalized, and the public women are examined once weekly by a surgeon appointed for the purpose. If a man can indicate the woman who has infected him, she is at once sequestrated until cured, but she suffers no pecuniary loss, as in Syracuse, where in such cases the prostitutes are fined 500 francs. The examination in the latter city is conducted by the Sisters of Charity. In Corfu the number of prostitutes is small, but the number of illegitimate children is

large, owing to the facility with which they can be disposed of without detection.

The health of the whole island is remarkably good.

Very respectfully, your obedient servant,

M. L. RUTH,

Passed Assistant Surgeon U. S. N.

To Medical Inspector A. L. GIHON,

U. S. Navy, Surgeon of the Fleet.

Meteorological register.

[United States flag ship Wabash. 1st rate.—Corfu, Greece. Latitude, 39° 48′ N., Longitude, 19° 50′ E.]

Date.	Barometer.				Thermometer, attached.				Thermometer, detached.				Wind.				Rain			
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Begun.	Ended.	Quantity.	
1874.					°	°	°	°	°	°	°	°								
July 25	29.91	29.92	29.84	29.87	76	75	77	75	76	74	81	81	Calm.	N. E.	Vble.	Vble.	.....	.....	.....	.....
26	29.95	29.97	29.89	29.90	74	77	80	82	74	77	83	83	Calm.	E. N. E.	N. W.	N. E.	.....	.....	.....	.....
27	29.96	29.97	29.93	29.92	77	74	82	77	77	79	83	83	Calm.	N. E.	N. E.	N. W.	.....	.....	.....	.....
28	29.97	29.98	29.95	29.94	74	78	82	79	74	79	84	83	N. W.	Calm.	N. E.	N. E.	.....	.....	.....	.....
29	30.02	30.00	29.97	30.03	74	74	82	83	74	79	85	85	Calm.	N. E.	W. N. W.	N. E.	.....	.....	.....	.....
30	30.00	29.99	29.96	29.94	74	80	82	83	74	81	84	84	Calm.	N. W.	N. W.	N. W.	.....	.....	.....	.....
31	29.95	29.95	29.92	29.90	79	80	82	80	79	81	84	83	N. W.	Calm.	N. E.	N.	.....	.....	.....	.....
Aug. 1	29.94	29.94	29.91	29.91	79	79	82	82	79	81	84	83	Calm.	Calm.	N.	Vble.	.....	.....	.....	.....
2	29.95	29.96	29.93	29.93	80	79	82	82	80	81	85	85	Calm.	Calm.	N. E.	N. E.	.....	.....	.....	.....
3	29.94	29.95	29.92	29.93	79	81	83	82	79	82	85	84	N. W.	Calm.	N. E.	Calm.	.....	.....	.....	.....
4	29.95	29.95	29.93	29.95	80	81	83	83	80	82	86	85	Vble.	Vble.	N. E.	.....	.....	.....	.....	.....
5	29.99	29.99	29.96	29.96	82	82	83	83	82	83	87	86	Calm.	N. E.	W. N. W.	.....	.....	.....	.....	.....
Mean ...	29.92	29.92	29.92	29.90	78.4	79.1	82.5	80.1	78.0	81.5	84.4	82.4								

Extreme range of barometer, 29.83–30.07. Extremes of temperature, 77°–87°. Number of days rain, none.

BARCELONA.

BARCELONA, SPAIN, *October* 25, 1873.

SIR: In compliance with your request, I have taken pains to visit and examine the various sanitary establishments of Barcelona, Spain.

The labor has not been a great one, for, for a city so pretentious, and one having so large a population of paupers and non-producers, Barcelona is remarkably deficient in all that pertains to the care and treatment of the poor, the sick, and the wounded.

I have been able to find only two establishments devoted entirely to hospital uses.

One of these is the civil hospital, "Hospital la Cruz;" the other the military hospital, devoted to the reception of the sick and wounded of the garrison of the city and department of Barcelona.

The "civil hospital" occupies an old convent. The building dates back to the eighteenth century, and, consequently, lacks in every particular the necessities of a well-constructed hospital of modern times.

Built of stone, it is damp and unwholesome. Intended for monastic uses, its stair-ways and approaches are narrow and ill-constructed, its wards and rooms badly ventilated, and, having been delivered over to the sanitary authorities when the population of the city was not great, it is now no longer adequate to accommodate the vast crowd of applicants that daily throng its doors.

Following the style of architecture of the early portion of the last century, its halls are high and narrow. On one side only windows are placed, and these few in number, far from the floor, and small in size. All the wards communicate one with the other, or, in fact, are all in one, with the exception of a few small special apartments where children and small-pox

patients are treated. So great is the demand for room, that the beds in the great wards are double-banked, and, in the smaller, are placed so close one to the other that they almost touch.

No pretense is made of alienating infectious and contagious diseases.

Venereal, strumous, lung, and heart patients are placed in the same wards, and often in the closest proximity; while surgical cases are mixed with the medical in a manner truly perplexing to one used to systematic arrangement.

Variola is looked upon as one of the ordinary maladies, and, consequently, no care whatever is taken to prevent its spread.

The small-pox ward communicates directly with the great ward of the hospital, and also with one of the smaller ones. The communicating-doors, at the time of my visit, were wide open, and patients, visitors, and nurses were unconcernedly strolling from one ward to another. In fact, one would not have been aware that he was in a pest-ward had not the characteristic odor of the disease and the repulsive faces of the patients called his attention. In this ward confluent and discrete cases, as well as patients suffering from varioloid, are huddled together, and no pains whatever seem to be taken to prevent disfiguration; at least I could see no patients being treated according to the modern teaching.

The wards, in addition to being crowded with visitors, patients, beds, and nurses, were hazy with smoke, for every inmate seemed to have full liberty to smoke his cigarette when he would, and the majority of them, at the time of my visit, were availing themselves of the privilege.

Owing to the material of which the floors are constructed, and the nature of the architecture of the halls, strict cleanliness perhaps is impossible; but, nevertheless, the degree of filth was such as to be totally unwarranted.

At present there are about seven hundred inmates, including all classes of diseases and injuries. As a matter of course, owing to the deficient sanitary and hygienic arrangements, the mortality is something frightful. The officer in charge seemed averse to making any direct statement, but said that the death-rate was large. I have, however, learned from outside sources that the number of deaths is out of all proportion to the population, and that it is an act of madness to intrust a person to the care of the "Holy Cross." So much does this opinion obtain, that I was warned against sending a patient, a case of angina pectoris, to be treated, being assured that he would receive neither careful nursing nor proper remedies.

I regret exceedingly being compelled to make such a gloomy report of the principal hospital of one of the principal cities of Spain, especially as in this case there is no necessity whatever for this condition of affairs.

The hospital is rich, owning many buildings in the city, and being the possessor of enormous rents, and there is no reason why a building suitable to the requirements of a large city should not be erected by the direction into whose hands so many rich legacies have dropped. I may say, however, that a project is now being entertained of constructing in the "Ensanche"—the new portion of Barcelona—a hospital on the most approved plan. It is probable, however, that nothing will be done for some time to come, as the unsettled condition of affairs and the unhappy state of the republic effectually prevent all municipal improvements.

A hospital for strumous children, of whom there are an immense number in Barcelona, is also talked of, and, it is to be hoped, will soon be constructed.

The military hospital occupies also a disused convent, and shares with the civil institution the disadvantage of having been constructed for other purposes. It is built in the form of

a quadrangle, around a court-yard, which is planted with trees. A garden, for the use of convalescents, is attached, but from its excessive neatness, and the undisturbed condition of the gravel of its walks, I should judge it was rarely used. The lower floor is devoted to dining-rooms, store-rooms, kitchens, clothing-rooms, offices of the administration, the pharmacy, and the chapel, all of which are admirably kept and well arranged for their purpose. The pharmacy has a laboratory attached, which seemed in every way well fitted with all the modern appliances. The upper floors are devoted to wards for the men, and special suites of apartments for officers. The wards are long and high, paved with tiles, and ventilated by windows on one side and a large stove at one end. The beds are placed sufficiently apart, and there is none of the crowding so objectionable in the civil institution. The number of inmates at present is about two hundred and fifty, but the hospital has a capacity of six hundred beds. To this institution are admitted only the sick and wounded of the garrison of the city of Barcelona, and of these the great proportion are sufferers from syphilis.

I regret to state that, in point of personal cleanliness, the condition of the patients in this hospital is deplorable. I do not remember ever to have seen men in hospital so disgustingly filthy.

Small-pox patients are received here at all times, but an upper isolated ward, from which visitors are excluded, is reserved for them.

The hospital is exclusively under military control.

The staff is as follows: 1 jefe director del hospital, Don Miguel Molins, subinspector 1 classe; 5 jefes de visita, medicos mayores; 2 primeros ó segundos medicos para servicio de guardia 1 subayudante de primero, 1 de segunda, y 1 de

tercera; 1 sargento primero, 1 segundo; 6 cabos primeros, 5 segundos; 29 sanitaros.

This may seem a large number of attendants for so small a number of patients, but the condition of affairs in and around Barcelona at present demands that a full medical staff shall at all times be ready for service.

From observations made in these two hospitals, and from information given me, I am led to believe that the prevailing diseases of Barcelona are those dependent upon its bad drainage, the filth of its streets, and the licentiousness of its people. Of course its exposed condition renders it liable to sudden changes of temperature, and consequently cases of pneumonitis and pleuritis are sufficiently common.

Owing to the fact that the poor are unprovided for by the state, the streets are thronged with beggars exhibiting every description of deformity and disease. The number of blind is something remarkable, and it is asserted that, in many cases, children are deprived of sight by their parents for the purpose of obtaining a subsistence by charity.

Diseases of the nervous system are quite common, so common, indeed, as to call the particular attention even of the unprofessional observer. Progressive locomotor ataxia is by no means rare, and it is said that the license given to sexual indulgence is causing this disease to afflict a disproportionate number of the Barcelonese.

Before closing this communication I desire to call your attention to the fact that, since the advent of the republic, there has been no systematic examination of the public women, and, consequently, syphilis in its worst form is present to a frightful extent. A large proportion of the men of this ship have been infected. Fortunately most of the cases are non-constitutional in their character, but a sufficient number of Hunterian chancres have presented themselves to make it pertinent to inquire

whether it will not be better, in the future, to restrain the men from indulging their sexual passions in Barcelona.

I have to say that during my visits I was treated with the utmost consideration by the officers attached to the institutions.

I am, sir, very respectfully, your obedient servant,

M. L. RUTH,

Passed Assistant Surgeon U. S. Navy.

Medical Inspector A. LEARY GIHON,

U. S. Navy, Surgeon of the Fleet.

REPORT OF C. J. CLEBORNE, M. D.,

Surgeon U. S. Navy.

U. S. S. CONGRESS.

KEY WEST, FLA., *January* 10, 1874.

SIR: I have the honor to make the following report of the sanitary condition of this ship, in accordance with paragraph 14, section 14, article 2, "Instructions for Medical Officers."

Very respectfully, &c.,

C. J. CLEBORNE, *M. D.*,

Surgeon U. S. N.

JOSEPH BEALE, *M. D.*,

Surgeon-General, and Chief of Bureau.

HYGIENE.

Complement of officers and men, 320; cubic feet air-space allowed to each individual on shipboard, 289; in cabin, 2,768; in wardroom, 626; in each wardroom-cabin, 148–206; to each individual in steerage, 257; to each forward officer, 245; cubic feet air-space of gun-deck, 47,602; of berth-deck, 24,389; of

cabin, 5,536; of wardroom, 9,395; of sick-bay, 2,571; of steerage, (two,) 1,542; of forward officers' rooms, 1,470; of dispensary, 184; of berth-deck cell, 190; of paymaster's office, 480; percentage of sickness, 72.19 of complement; of mortality, 1.75 of sick.

Ventilation.—Though superior in many respect to others of her class, the ventilation of this vessel is still very defective. Owing to the comparatively small number of the crew, the men sling their hammocks on every second hook of the berth-deck and gun-deck, and are thus made pretty comfortable, though the atmosphere of these decks, especially when at sea, is extremely impure. In port, and in fine weather at sea, the air-ports are kept open and wind-sails set, but there are not a sufficient number of the latter, nor are they of the proper dimensions for the engine and fire rooms and berth-deck.

Next to the cabin the wardroom is decidedly the best ventilated part of the ship. It has large open hatches, and when two wind-sails are down the air is constantly changed, and but little complaint is made, except when the hatch is removed from the after store-room or cockpit. In this part are the store-rooms of the dispensary, gunner's lockers, and paymaster's bread-rooms, from which a heavy and unpleasant odor is occasionally exhaled.

In the fire-room there are six permanent ventilators, but they are not sufficiently large for the purpose intended, nor are they high enough above the spar-deck to catch the little wind that may reach them through the stores and boats by which they are generally surrounded.

In the gun-deck are a number of deck-plates, which are fitted with circular gratings for the ventilation of the berth-deck, but these plates are never removed, for the reason that dirt, water, &c., might (in sweeping or washing) get below.

There are no means provided for the ventilation of the fore-

peak and yeoman's store-room, in which the atmosphere is often so impure that it will not support combustion.

The sick-bay is well ventilated, but the dispensary, forward-officers' rooms, and paymaster's office (situated near the engine-room) are so stuffy and so oppressively warm (especially when the ship is under steam) as to be almost unbearable.

To remedy some of these defects, I would suggest a greater number of wind-sails of larger size in the fly and body, with hoops at the end instead of solid wooden bottoms; permanent ventilators in the fire-room of at least twice the present diameter, made telescopic above the spar-deck, so that they could be raised or lowered at will; and a permanent ventilator of the same kind, but of smaller size, leading from the spar-deck, down through the sick-bay, into the fore-peak and yeoman's room.

Above all, I would urge the necessity for larger air-ports—they should be at least twice the size of those now in use—say, of the same size and pattern as those in the steamer Bienville, (one of the purchased vessels during the war,) or the large square air-port as used in the British navy in vessels of the Rinaldo class. The old idea that large air-ports weakened the strength of the ship and spoiled the appearance of a ship of war has long been exploded, and the advantages of the square air-ports for vessels cruising in the tropics is now generally conceded.

I have also to recommend the use of light galvanized-iron gratings with large apertures for all hatches on the berth-deck, or in the wardroom, in place of the wooden ones at present in use; and the introduction of two or three rotary fans, which could be worked by the engine when under steam, or by a small donkey-engine, which could be also used for the condensation of water.

Lighting.—The necessity for increased light is shown by the pale, bleached appearance of many of our men, despite the care taken to compel the crew to expose themselves daily to the

beneficent influence of the solar rays; but this difficulty may be materially obviated by the enlargement of the air-ports, the removal of the gun-deck plates in fine weather, and a more liberal use of white paint or whitewash on the berth-deck, store-rooms, and holds.

Warming.—The number of steam-heaters is ample, but they are badly arranged. In some parts of the ship the size of the steam-coils is double what is necessary, while the pipes leading to these coils in the wardroom and cabin are sources of annoyance and discomfort to the officers through whose rooms and apartments they pass. These pipes are generally very badly arranged, and surely some better mode of conducting them might be devised, so that when steam is needed in the cabin (for example) the wardroom officers need not be roasted in consequence.

Water.—This has generally been of good quality when purchased, but our distilled water, owing to some defects in the condensers, is often oily and unpalatable. This arises in part from the ridiculously small tank capacity of the ship—only six thousand gallons—which necessitates frequent condensing. There are three condensers on board, two of which are old-fashioned, and one (a small Normandy) somewhat out of repair. One good French apparatus, or an improved Normandy of large size, such as is used on the Pacific Mail steamers, would be much better than the three now in use. The tank-capacity ought to be increased to 20,000 to 25,000 gallons, and the tank might be coated inside with a new concrete invented by Captain Crease, R. N., of Portsmouth, England. This substance has been experimented upon at Netley by Drs. Parke and Aiken, (to whom I suggested its application for this purpose,) and I believe it would be found far superior to the waxing or whitewashing now in vogue. A donkey-engine would be better for the purpose of condensing than the main boiler, which has now

to be used every eight or ten days, much to the discomfort of the crew in warm weather. This little engine might also be used for working the rotary fans suggested under the head of ventilation.

Food.—The food has generally been of a fair quality, but since the ship arrived on the European station complaints have been made of some issues, especially of beef, flour, coffee, and pickles. I have examined the beef and find it badly preserved, and much of it unfit for issue. The flour when tested was found to be sour and adulterated with potato and other kinds of starch; and the coffee, purchased in England, was largely adulterated with chiccory. The pickles were of middling quality, and the molasses was a coarse kind of sugar-house; but the pork and beans, and other articles in the pay department furnished as stores, appeared to be of excellent quality.

I would suggest a stricter examination of all stores purchased in open market at home and abroad, and the application of the proper food-tests before purchasing. The canned beef or bouilli, though a capital ration, appears to find but little favor with the men. Many messes dispose of nearly all they draw as a ration to the Bum-boatmen, or exchange it for other food. Perhaps the alternate issue of preserved mutton or meat in some other form might prevent this by giving greater variety to the diet. I am convinced that an increased allowance of butter and of cheese would be beneficial; and I believe that the introduction of the canteen system (for the sale of beer or wine, as in the British navy) would be a great boon to the crew.

Clothing.—The clothing appears to be of good quality, though flannel blouses of many colors and poor texture may daily be seen. This is accounted for by men buying inferior goods on shore at a cheaper rate than that charged by the Government. Some complaint having been made of the color of some flan-

nel on board, I tested some pieces (said to be the same as that which was issued to the men) and found it to be of very fair quality, unmixed, and dyed in the wool. It is very probable that the best indigo-flannel will, under certain circumstances, say from excessive washing with strong alkali-soap, exposure to the sun, salt water, &c., change color, and otherwise deteriorate.

General hygienic considerations and suggestions.—I would particularly call the attention of the Bureau to the necessity for a large bath-tub and a water-closet or earth-closet in the sick-bay. The close-stools now used become extremely foul and disagreeable after a year or two's use, besides which they are unhandy and inconvenient. The bath-tub might be easily connected with the steam-coil, so that hot water could be obtained in an emergency.

Attention has been called so frequently to the want of a proper place and conveniences on shipboard for the daily ablution of the crew, that I need not do more than mention the matter in this connection, and express the hope that in the fitting out of vessels in the future some arrangements for the purpose may be made.

The berth-deck of this vessel should be shellacked, as the wood of which it is made is unusually soft and porous, and remains damp for many hours after washing. If objections be raised to the dark or dirty appearance of shellac, then the decks might be paraffined like the floor of a hospital-ward, or a coating of water-glass paint (colored with yellow ocher) could be used for this purpose.

In conclusion, I beg to call the attention of the Bureau to an article, now on the files of the Department, entitled "Recruiting in the Navy," in which some suggestions are made for the better prevention of improper enlistments. (*Vide* Part 11.)

[illegible] and a thermometer are the only instruments possessed at present for [illegible]

Months.	Thermometer.		Hygrometer.	
1855.				
July	Average monthly temperature	68	Average monthly humidity	63
	Maximum temperature	70	Maximum humidity	68
	Minimum temperature	64	Minimum humidity	59
August	Average monthly temperature	67	Average monthly humidity	64
	Maximum temperature	70	Maximum humidity	71
	Minimum temperature	62	Minimum humidity	57
September	Average monthly temperature	67	Average monthly humidity	61
	Maximum temperature	69	Maximum humidity	67
	Minimum temperature	66	Minimum humidity	57
October	Average monthly temperature	65	Average monthly humidity	62
	Maximum temperature	70	Maximum humidity	70
	Minimum temperature	63	Minimum humidity	59
November	Average monthly temperature	65	Average monthly humidity	61
	Maximum temperature	70	Maximum humidity	69
	Minimum temperature	62	Minimum humidity	57
December	Average monthly temperature	70	Average monthly humidity	68
	Maximum temperature	72	Maximum humidity	79
	Minimum temperature	64	Minimum humidity	64

Report of David Kindleberger, M. D.,

Surgeon U. S. Navy.

U. S. S. Wachusett.

HYGIENE.

Complement of officers and men, 200; cubic feet air space allowed each individual on shipboard—berth-deck, 88; steerage, 295; wardroom, 242; percentage of sickness, ——; of mortality, ——.

Ventilation.—The only means of ventilating berth-deck are three hatches (5 feet 4 inches by 4 feet 3 inches, 5 feet by 3 feet 10 inches, and 2 feet by 2 feet) and two small ventilators: While in port by the removal of dead-lights and with the use of wind-sails a sufficient quantity of air is obtained. At sea the diffusion of air does not take place so readily, notwithstanding the use of wind-sails. No feasible remedies can be suggested. The steerage and wardroom are well ventilated.

Lighting.—The amount of light is sufficient, excepting in

cloudy weather, its avenues of access being hatches and air-ports. No important defects.

Warming.—Since her commission, the ship having been in warm latitudes, the amount of heat has been more than sufficient, its sources being the galley and steam-coil on the berth-deck, and the steam-coil in the other inhabited parts of ship. No defects but that of superfluous quantity. A less amount would be desirable on the berth-deck, and that desideratum could be obtained by the removal of the galley to the upper deck.

Water.—It is principally obtained by distillation. It is usually pure, but is sometimes contaminated with a small quantity of salt, and is preserved in iron tanks. One thousand gallons may be made daily.

Food.—It is of the best quality, and is prepared in a palatable and digestible form. The daily ration amounts to about 22 ounces, avoirdupois.

Clothing.—The men are compelled to have certain articles of dress, so that they may appear neat and be able to keep themselves clean. The texture of clothing is usually good; and, considering the rough usage to which clothes are subjected, they last remarkably well.

The only hygienic suggestion deemed advisable is the removal of the galley to the upper deck during warm weather. At sea the air is much contaminated by the emanations from it, and when the weather is warm the heat is extremely unpleasant.

CLIMATOLOGY.

Since the beginning of the year the cruising of this ship has been very extensive, and the stay in port, in many cases, so short that but little information could be obtained.

Nice.—As a sanitarium, I think Nice has been overestimated. The Maritime Alps imperfectly protect the city, permitting

through its gorges the pernicious winds of the interior. For certain classes of invalids, its climate is beneficial, but for phthisical valetudinarians, who principally resort there, the location is particularly ill-chosen. The *mistral*, or northwest wind, is the most unpleasant to which the city is exposed. Even the well are injuriously affected. This wind lasts sometimes a week or more, but ordinarily a day or two. The *mistral* blows oftener than any other wind probably, but is especially frequent in the autumn. The north and northeast winds are keen and dry. The easterly winds are pernicious, particularly to consumptives. The southerly winds are mild and humid. The atmosphere is dry and irritating, and consequently *not* adapted to those having an inflammatory disease of the chest. The temperature has extreme ranges, and the difference between sunshine and shade is remarkable.

The mean annual temperature is about 59° F.; winter, 46°.33; spring, 55°.92; summer, 71°.83; autumn, 61°.52; the difference between the hottest and coldest month of the year, 29°.45.

The annual fall of rain is 26 inches, the principal part being precipitated during October and November. According to statistics, about one-seventh of the deaths at Nice take place from phthisis. Although the Nicoise are very subject to chest affections, the great mortality therefrom is probably made so by the demise of foreigners. To those affected with rheumatism and gout, scrofula and dyspepsia, and a general relaxation of the system, the climate of Nice is beneficial.

Leghorn.—This city is situated in the lowlands of Tuscany, and possesses a damp climate. It is subject to keen winds, and is not to be recommended as a sanitarium. It has a mean annual temperature of 61°.98 F.

Spezzia.—This sea-port of Italy is noted for its almost incomparable scenery, and its neighborhood affords fine bathing in the summer. It is not much resorted to.

Naples.—Being one of the most lovely spots in the world, there is much to attract; but, unfortunately, it is not to be recommended to the invalid, especially to the consumptive. Its winds are pernicious. It is fully exposed to the southwest and west winds, while from the interior the north wind descends through openings in the hills with violence. In Naples, the *mistral* is a cold, moist wind, and exercises well-marked influences. The most pernicious wind is the sirocco, or southeast wind. It exercises an enervating influence, not only upon the physical and intellectual capacities of man, but its effects may also be seen upon animals and plants. Its mean annual temperature is 60°.26 F. The diseases that are most frequent are inflammatory affections of the chest, rheumatism, and malarial fevers. Ophthalmia is also met with.

Malta.—The climate is modified by its physical surroundings. Its mean temperature is 64° Fahr. The winds from the south and southeast are hot and dry, and exhibit their power and influence to a greater degree than in Naples. Atmosphere subject to sudden changes. From the mildness of climate incipient phthisis does well.

Alexandria, Egypt.—Although the climate of Egypt is beneficial in many diseases, that of Alexandria in particular cannot be recommended. That city is surrounded by water, and possesses a moist climate. Rain is common from October to March in Alexandria, but scarcely known in Upper Egypt. Ophthalmia is constantly present to a fearful extent. The inhabitants generally are strong and robust, the sickly and delicate having probably died in their infancy from the want of care, &c., on the part of mothers.

Barcelona, Spain.—This city is partially protected on the interior from the cold winds of the north. Its mean annual temperature 63°. There are about seventy days of rain-fall, and the vicissitudes of the weather do not recommend it as a

resort for invalids. Several valuable mineral springs are in the neighborhood, but not easily accessible. The sewerage of the city is abominable, but is being improved. The streets of the old town are narrow and filled with foul odors; the new part of the city, however, has wide avenues, and presents a very inviting appearance. Typhoid and typhus fevers are frequent visitors to this city. (*Vide* Report of Dr. Ruth, *ante*.)

Cadiz, Spain.—Climate soft and humid, and its influence upon system sedative and relaxing. Mean temperature, 62° F. Rain-fall, 100 days. Consumptives sometimes do well in Cadiz, especially when there is a disposition to hemoptysis. Fires are rarely required.

Lisbon, Portugal.—This city occupies an amphitheatrical position upon numerous hills, the valleys between which giving passage to various winds. The winds of Lisbon are penetrating and vehement, and the vicissitudes of temperature produce many diseases of the air-cavity. Phthisis is very common, and, according to the mortuary reports of Hospital St. José, about 10 per cent. of the deaths in that institution result from consumption. The mean annual temperature is 61°.40 F. The north and northeast winds are cold, the south warm, and the west cool and refreshing. The climate is dry and stimulating, but the annual rain-fall is 23 inches.

Cintra, the fashionable place of residence of the Lisbonese, is more healthy than the city, but in the winter it is not to be recommended.

Gibraltar.—This place is not to be recommended. The most pernicious wind is the "levante;" it is raw, bleak, and humid. Mean temperature, 68° F. Near Gibraltar there are several mineral springs, reported to be good in rheumatism, &c.

Funchal, Madeira.—The island of Madeira is one of the best resorts in the world. It possesses one of the most equable climates in the world, there being a difference of only 8° F. between sum-

mer and winter. The atmosphere is charged with moisture almost to saturation. Fires are rarely necessary. Funchal is not so desirable as a place of residence as some other parts of the island. The "leste" is the great unpleasant feature of the climate, the temperature at the time of its prevalence being exceedingly high, moist, and stimulating. The highest summer temperature is about 82° in the shade. Mean annual rainfall, 32 inches. The *leste* owes its baneful properties to its previous passage across the African desert.

The diseases that prevail in Madeira are elephantiasis and lepra, hemorrhoids, dyspepsia, &c. Owing to the relaxing character of the climate, diseases requiring a tonic, bracing influence will not do well. However, in bronchial, laryngeal, and pulmonary complaints the climate soothes the disordered structures. Incipient stages of phthisis do well at Madeira.

A large number of unimportant places were visited during the year, but none of them possess any remarkable characteristics.

Meteorological register.

[United States steamer Wachusett, 3d rate. Latitude, ; Longitude, . Altitude of barometer above sea, 10 feet.]

Date.	Barometer.				Thermometer, attached.				Thermom., detached.					Hygrometer.					Sky.			
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Daily mean.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Daily mean.	Sunrise.	9 a. m.	3 p. m.	9 p m.
1873.																						
Dec. 1	30.35	30.37	30.30	30.30	66	66	69	68	68	66	70	68	68	65	67	70	69	67	.....	.....	.....	.....
2	30.32	30.31	30.23	30.20	64	.....	.....	.....	65	66	66	66	66	66	67	67	66	66	.....	.....	.....	.....
3	30.25	30.26	30.22	30.26	.....	.....	.....	68	66	66	67	69	67	66	66	68	68	67	.....	.....	.....	.....
4	30.24	30.26	30.24	30.29	66	.....	69	66	64	67	69	70	68	66	66	69	69	67	.....	.....	.....	.....
5	30.28	30.29	30.26	30.30	.....	.....	.....	.....	67	68	68	69	68	67	67	68	68	67	.....	.....	.....	.....
6	30.30	30.30	30.15	30.06	67	70	70	69	68	70	70	69	69	67	68	68	68	68	.....	.....	.....	.....
7	30.05	30.02	30.02	30.01	69	69	70	70	69	70	71	70	70	68	68	70	70	69	.....	.....	.....	.....
8	29.95	29.95	29.84	29.87	70	70	70	70	69	69	71	69	69	68	68	68	68	68	.....	.....	.....	.....
9	30.02	30.03	30.12	30.17	70	70	70	70	70	72	70	70	70	70	70	69	69	70	.....	.....	.....	.....
10	30.18	30.23	30.20	30.23	72	75	75	71	72	73	74	74	73	70	70	71	69	70	.....	.....	.....	.....
11	30.23	30.30	30.25	30.25	72	73	73	71	74	74	74	74	74	73	74	74	74	74	.....	.....	.....	.....
12	30.22	30.23	30.19	30.22	72	74	74	78	70	75	72	72	72	69	74	75	76	74	.....	.....	.....	.....
13	30.19	30.20	30.20	30.22	75	75	76	76	75	78	75	72	74	75	75	76	76	76	.....	.....	.....	.....
14	30.21	30.23	30.18	30.18	74	76	76	76	75	75	75	73	74	74	77	75	75	75	.....	.....	.....	.....
15	30.20	30.21	30.17	30.18	76	76	76	76	75	76	76	74	76	75	75	75	75	75	.....	.....	.....	.....
16	30.11	30.09	30.08	30.05	76	76	76	76	76	77	77	76	76	75	76	76	76	76	.....	.....	.....	.....
17	30.00	30.02	30.00	30.04	76	76	76	76	76	76	76	76	76	76	75	75	76	76	.....	.....	.....	.....
18	30.06	30.10	30.11	30.15	76	76	77	77	77	76	76	77	76	75	76	76	74	75	.....	.....	.....	.....
19	30.11	30.14	30.13	30.14	75	75	78	78	76	77	77	79	77	75	75	78	78	76	.....	.....	.....	.....
20	30.11	30.14	30.12	30.15	78	77	78	78	75	76	80	79	77	77	77	77	77	77	.....	.....	.....	.....
21	30.14	30.16	30.18	30.20	78	79	78	79	78	77	78	77	77	77	77	80	77	78	.....	.....	.....	.....
22	30.14	30.22	30.22	30.25	78	78	78	78	78	78	80	78	78	75	78	79	78	77	.....	.....	.....	.....
23	30.22	30.26	30.22	30.24	76	79	79	79	78	79	80	79	79	79	79	78	79	78	.....	.....	.....	.....
24	30.19	30.17	30.16	30.18	78	78	78	79	77	80	80	79	79	78	78	80	78	79	.....	.....	.....	.....
25	30.17	30.18	30.14	30.12	79	79	80	80	79	79	80	79	79	79	80	81	80	80	.....	.....	.....	.....
26	30.13	30.13	30.13	30.11	.....	.....	81	80	80	81	81	80	80	81	81	80	80	81	.....	.....	.....	.....
27	30.13	30.18	30.16	30.20	80	80	80	80	81	81	81	81	81	79	80	80	79	80	.....	.....	.....	.....
28	30.16	30.20	30.18	30.22	80	80	80	80	80	80	82	79	80	79	78	80	78	79	.....	.....	.....	.....
29	30.22	30.25	30.20	30.23	80	78	78	78	80	80	81	79	80	76	75	75	72	74	.....	.....	.....	.....
30	30.22	30.25	30.24	30.26	78	78	78	78	75	76	75	72	74	72	73	70	70	72	.....	.....	.....	.....
31	30.25	30.30	30.30	30.24	77	77	77	78	71	69	67	65	68	70	68	65	65	67	.....	.....	.....	.....
Mean....	30.11	30.19	30.17	30.18	.....	.....	.....	.....	73	74	75	74	....	73	73	74	73	....				

Meteorological register—Continued.

[United States steamer Wachusett, 3d rate. Latitude, ; Longitude, . Altitude of barometer above sea, 10 feet.]

Date.	Wind.				Clouds.				Rain.			Remarks.
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Began.	Ended.	Quantity.	
1873.												
Dec. 1	W. N. W.	Variable.	N. W.	N. N. E.	Stratus..	Stratus..	Cir. cum.	Cum.-str.	.....	.....	.....	At sea.
2	E. N. E.	E. N. E.	E. N. E.	N. E.	Cumulus	Cumulus	Cir.-stra	Cum.-str.	.....	.....	.....	Do.
3	E. N.	E. N. E.	E.	E.	Cir , n.,st	Nim.,str.	Nim ,str.	Cumulus	.....	.....	.....	Do.
4	W. S.	S. W.	E. S. E.	N. E.	Cum., ni	Cir.-cum.	Cir.-cum.	Cumulus	.....	.....	.....	Do.
5	N. E.	N. E.	Variable.	S. E.	Cumulus	Cumulus	Cir.-cum.	Cir.-cum.	.....	.....	.....	Madeira.
6	S. E. E.	S. S. E.	S.	S. S. E.	Cir.,nim	Cir.-c., ni.	Cir.-stra	Cum.-str.	2.30 a.m.	2 p. m..	.....	At sea.
7	S. E.	S. E.	S. W.	S. E.	Cu.-strat.	Cu. s ,ni	Cum.-str.	Nim.,str.	4 a. m...	12 m	.....	Do.
8	S. W.	S. W. S.	S. W. E.	S E.	Cir.-cum.	Cir.-cum.	Cum -str.	Cumulus	.....	.....	.....	Do
9	W S.	S. E. S.	S.	S. E.	Stratus..	Nimbus	Cir., n.,st.	Stratus..	....	.....	.....	Do.
10	E. S.	S	S. E.	S. E.	Ci.-cu., st	Strat., cir	Cumulus	Cir.-cum.	1 a. m...	4 a. m...	.....	Do.
11	S.	S. E.	S E.	S. E.	Cir.-cum.	Strat., cir	Cir.-cum.	Cir.,nim	.....	.....	.....	Do.
12	S. E.	S. E.	S. E.	S. E.	Cir.-cum.	Stratus .	Stratus..	Cir.-cum.	.....	.....	.....	Do.
13	S. E.	S. E.	S. E.	S. E.	Cir.-cum.	Cir.-cum	Cir.-stra	Nim.,str.	4 a. m...	4 p. m..	.....	Do.
14	E.	E.	E.	E.	Cir.,nim	Cir.,nim	Cir.,nim	Cir.-cum.	2 a. m...	6 p. m...	.....	Do.
15	E.	E.	E.	E.	Cir.-cum.	Cir.-c.,ni.	Nim., cir.	Cir., nim.	12 m	6 p. m...	.....	Do.
16	E.	E.	E.	E. N. E.	Cir.-cum.	Cir.,nim	Nim., cir.	Cir., nim.	.....	.....	.....	Do.
17	E. S.	Variable.	E S.	E. N.	Cir.,nim	Cir.,nim	Cir.-cum.	Cumulus	4 a. m...	8 a. m...	.....	Do.
18	E. N. E.	N. E. E.	E. N. E.	N. E.	Cir.,nim	Cir.,nim	Cir.,nim	Cir.-cum.	7 p. m ..	8 p. m...	.....	Do.
19	N. E. E.	N. E.	Variable.	N. E.	Cirrus ..	Cir.,nim	Cir.,nim.	Cir.-cum.	4 a. m ..	6 a. m...	.....	Do.
20	Variable	Variable.	E. S.	Calm.	Cir.,nim	Cir.,nim.	Cir.-cum.	Cir.,nim	.....	.....	.....	Do.
21	Variable.	S. E.	Variable.	S. W.	Cirrus...	Cir.-cum.	Cir.-cum.	Cir.-cum.	.....	.....	.....	Do.
22	Calm.	Calm.	Calm.	Calm.	Cir.,nim	Cir.,nim	Cir.-cum.	Cir.,nim	4 p. m...	8 p. m...	.....	Do.
23	Variable.	S. E.	E. S. E.	S. E.	Cir.,nim	Cir.-stra	Cir.-stra	Cir.,nim	.....	.....	.....	Do.
24	E.	E.	S. E.	E. N.	Cir.,nim	Cir.,nim	Cir.,nim	Cir.-stra	.....	.....	.....	Do.
25	E.	E.	E. S.	E. S. E.	Cirrus ..	Cir.-cum.	Cir.-cum.	Cir.-cum.	11 a. m..	2 p. m...	.....	At St. Thomas.
26	S E.	S. E.	S. E.	S. E.	Cir.-cum.	Cir.-cum.	Cumulus	Cumulus	.....	.....	.....	At sea.
27	E.	E. S.	E. S.	S. E.	Cir.-cum.	Cirrus...	Cir.-cum.	Cir.-cum.	.....	.....	.....	Do.
28	E.	Variable.	Variable.	Veriable.	Stratus..	Cir.-stra	Cir.-stra.	Cir.-cum.	.....	.....	.....	Do.
29	Variable.	S. W.	N. E.	N. E.	Cir.-stra.	Cir.-stra	Cir -cum.	Cir.-cum.	.....	.....	.....	Do.
30	Variable.	S. W.	N.	E.	Cir.,nim	Cir.-cum.	Cir.,nim	Cir.,nim	.....	.....	.....	Do.
31	Variable.	E.	E.	E.	Cir.,nim	Cir.,nim	Cir.,nim	Cirrus...	7 a. m...	9 a. m...	.....	Do.
Mean												

Meteorological register.

[United States ship Wachusett, 3d rate. Latitude, ; Longitude, . Altitude of barometer above sea, 10 feet.]

Date.	Barometer.				Thermom., attached.				Thermom., detached.					Hygrometer.					Sky.			
	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Daily mean.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Daily mean.	Sunrise.	9 a. m.	3 p. m.	9 p. m.
1873.					°	°	°	°	°	°	°	°	°	°	°	°	°	°				
Oct. 1	29.98	30.04	30.05	30.10	68	70	71	68	69	72	76	71	72	68	70	75	71	71	.....	.....	.....	.....
2	30.05	30.06	30.02	30.04	.....	.....	.....	.....	68	70	75	74	75	68	70	75	74	72	.....	.....	.....	.....
3	29.97	29.90	29.89	29.92	.....	.....	.....	.....	72	74	75	74	73	71	73	75	74	73	.....	.....	.....	.....
4	29.89	29.90	29.93	30.01	70	.....	.....	.....	67	70	68	67	68	66	70	68	67	68	.....	.....	.....	.....
5	30.10	30.20	30.15	30.19	70	.....	.....	.....	64	66	67	66	65	64	66	67	66	65	.....	.....	.....	.....
6	30.16	30.00	30.03	30.05	.....	.....	74	70	64	68	71	68	67	64	66	70	66	66	.....	.....	.....	.....
7	30.05	30.10	30.10	30.14	68	.....	.....	.....	67	68	67	61	65	66	67	67	61	65	.....	.....	.....	.....
8	30.24	30.25	30.31	30.38	.....	.....	.....	.....	58	68	62	60	62	58	60	59	51	57	.....	.....	.....	.....
9	30.36	30.40	30.37	30.38	55	57	63	63	56	58	62	62	60	56	58	62	62	59	.....	.....	.....	.....
10	30.30	30.33	30.27	30.25	60	.....	63	.....	62	64	66	62	65	63	64	61	61	62	.....	.....	.....	.....
11	30.17	30.19	30.15	30.15	.....	.....	.....	.....	60	63	67	65	63	60	63	66	65	63	.....	.....	.....	.....
12	30.10	30.10	30.06	30.04	.....	.....	.....	.....	62	66	68	67	65	62	66	67	66	65	.....	.....	.....	.....
13	30.09	30.10	30.07	30.05	60	64	.....	.....	60	61	63	63	61	60	59	62	62	61	.....	.....	.....	.....
14	30.00	29.98	29.94	29.95	64	65	.....	63	63	64	64	58	62	63	64	68	68	65	.....	.....	.....	.....
15	29.90	29.85	29.84	29.82	.....	.....	.....	.....	58	60	63	61	60	62	58	63	58	60	.....	.....	.....	.....
16	29.93	29.95	29.96	30.00	65	.....	.....	.....	58	64	69	65	64	59	59	62	62	60	.....	.....	.....	.....
17	29.96	30.00	30.01	30.04	.....	.....	.....	.....	60	62	66	67	64	57	64	68	67	64	.....	.....	.....	.....
18	30.07	30.13	30.14	30.18	.....	.....	68	.....	62	64	68	65	65	59	60	66	67	63	.....	.....	.....	.....
19	30.25	30.26	30.22	30.27	.....	67	.....	.....	62	65	69	64	65	60	62	59	60	60	.....	.....	.....	.....
20	30.28	30.29	30.25	30.25	.....	.....	.....	.....	65	69	70	64	68	63	65	68	64	65	.....	.....	.....	.....
21	30.26	30.27	30.23	30.22	.....	67	.....	.....	63	64	70	61	64	63	67	69	64	65	.....	.....	.....	.....
22	30.17	30.22	30.16	30.12	.....	.....	.....	.....	60	61	69	63	63	63	65	68	61	64	.....	.....	.....	.....
23	30.08	30.07	29.97	29.94	.....	.....	67	.....	63	66	66	66	65	60	61	68	63	63	.....	.....	.....	.....
24	29.80	29.90	29.99	30.05	.....	65	.....	.....	64	63	65	65	64	62	66	67	66	65	.....	.....	.....	.....
25	30.06	30.09	30.10	30.00	64	64	65	65	63	62	67	65	64	64	62	63	62	62	.....	.....	.....	.....
26	30.14	30.12	30.20	30.12	.....	.....	65	.....	58	61	63	63	61	62	61	65	64	63	.....	.....	.....	.....
27	30.12	30.14	30.10	30.09	.....	.....	.....	.....	57	59	62	63	61	58	61	64	62	61	.....	.....	.....	.....
28	30.07	30.07	30.05	30.00	.....	.....	.....	.....	54	56	67	59	60	57	59	62	61	59	.....	.....	.....	.....
29	29.92	29.90	29.90	29.94	.....	63	.....	.....	58	60	59	59	59	55	57	59	59	57	.....	.....	.....	.....
30	29.90	29.95	29.93	29.95	64	64	64	.....	62	62	66	63	63	59	61	61	59	60	.....	.....	.....	.....
31	29.93	29.97	30.03	30.07	63	.....	.....	.....	61	60	63	62	61	61	61	65	60	62	.....	.....	.....	.....
Mean....	30.07	30.09	30.08	30.09	.....	.....	.....	.....	63	63	69	68	..	60	63	66	64	...				

Meteorological register—Continued.

[United states ship Wachusett, 3d rate. Latitude, ; Longitude, . Altitude of barometer above sea, 10 feet.]

Date.	Wind.				Clouds.				Rain.			Remarks.
	Sunrise.	9 a.m.	3 p. m.	9 p. m.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Begun.	Ended.	Quantity.	
1873.												
Oct. 1	S. W.	S. W.	S. W.	S. W.	Cir., nim	Cir.-cum.	Cumulus	Cumulus	.....	.....	.....	At Ferrol, Spain.
2	Calm.	W.	S. W.	S. W.	Cumulus	Cir.-cum.	Cir.-cum.	Cum.,cir.	.....	.....	.....	Do.
3	S. W.	S.	Calm.	S.	Cumulus	Cir., nim.	Nim., cir.	Cir., nim.	4 a. m ...	8 a. m ...	.....	Do.
4	N. W.	W.	S. W.	Calm.	Cu., nim	Nimbus	Nimbus	Cumulus	6 a. m ...	5 p. m ...	.....	Do.
5	N. E.	N. E.	W. E.	E. S.	Cumulus	Cir., nim.	Cir., nim.	Cumulus	8 a. m ...	9.30 p. m	.....	At Corunna, Spain.
6	S.	S.	N. W.	N.	Cumulus	Cirrus	Cir.-cum.	Cum.,cir.	.....	.....	.....	Do.
7	S.	Calm.	N. W.	N. E.	Cir.-stra	Cir., nim	Cu., nim	Cu , nim	.....	.....	.....	At sea.
8	S.	Calm.	N. W.	N. E.	Cir.-stra	Cir., nim.	Cu., nim.	Cu., nim	.....	.....	.....	At Vigo, Spain.
9	N. E.	N. E.	N. E.	E.	Cumulus	Cumulus	Cumulus	Cir.-cum.	.....	.....	.....	Do.
10	Calm.	Calm.	N. W.	S. E.	Cumulus	Cir.-cum.	Cumulus	Cumulus	4 p. m ...	6 a. m ...	.....	Do.
11	Calm.	N. W.	Variable.	E.	Cu., nim	Cir.-cum.	Nim., cir.	Cumulus	.....	.....	.....	Do.
12	N. E.	N. E.	W.	Calm.	Cir.-cum.	Cir.-cum.	Cirrus . .	Nim., cir.	.....	.....	.....	At sea.
13	S. E.	Calm.	N.	W.	Cirrus . .	Cir.-cum.	Cir.-st.,cu	Nim., cir.	.....	.....	.....	Do.
14	S. W.	N.	N. E.	N. W.	Nimbus	Cir.-cum.	Nim , cir.	Stra., cu	.....	.....	.....	At Lisbon.
15	N.	N.	N.	N.	Nim., cir.	Cir.-cum.	Cirrus . .	Cirrus . .	4 a. m ...	6 p. m ...	.....	Do.
16	Calm.	E.	E.	Calm.	.....	Stratus . .	Cirrus . .	Cirrus .	.....	.....	.....	Do.
17	Calm.	E.	W.	W.	Cumulus	Cumulus	Cumulus	Cumulus	.....	.....	.....	Do.
18	Calm.	E.	W.	N.	Cirrus . .	Cirrus . .	Cirrus . .	Cirrus . .	.....	.....	.....	Do.
19	Calm.	N.	N.	N.	.....	.....	.....	.....	.....	.....	.....	Do.
20	N. E.	N. E.	N. E.	N.	.....	.....	.....	.....	.....	.....	.....	Do.
21	Calm.	Calm.	Calm.	Calm.	Cumulus	Cumulus	Cumulus	Cumulus	.....	.....	.....	Do.
22	Calm.	W.	W.	W.	.....	.....	.....	.....	.....	.....	.....	Do.
23	W. N. W.	W.	N. W.	W.	Cir.-cum.	Nim., cir.	Nimbus	Nimbus	.....	.....	.....	At sea.
24	W.	N. E.	N.	N. E.	Nimbus	Nim., cir.	Cir.-stra	Cu., nim.	6 p. m ...	8 p. m ...	.....	At Cadiz, Spain.
25	W. N.	N. E.	W.	N. E.	Nimbus	Nim., cir.	Nim., cir.	Cumulus	2 a. m ...	8 a. m ...	.....	At Tangier, Morocco.
26	N. E.	N.	N. N. E.	W.	.....	Cumulus	Cir.-cum.	Cum.,cir	2 a. m ...	4 a. m ...	.....	At Gibraltar.
27	S.	S. S. W.	W.	Variable.	Cumulus	Cumulus	Nim., cir.	Strat ,cir	.....	.....	.....	Do.
28	N. N. E.	N. W.	N. N. W.	N.	Cir.-cum.	Nim., cir.	Cir.-cum.	Cir.-cum.	.....	.....	.....	Do.
29	N. W.	W.	N.	W.	Cir.-cum.	Cir.-cum.	Nim., str.	Nim., cu.	.....	.....	.....	Do.
30	W.	W.	W. N. W.	N. W.	Cumulus	Strat.,cu.	Cir.-stra	Cir.-cum.	.....	.....	.....	At sea.
31	N. W.	N. W.	N. E.	N. E.	Strat.,cu.	Cu.-strat	Cumulus	Strat.,cu.	.....	.....	.....	Do.

Report of Thos. C. Walton, M. D.,

Surgeon U. S. Navy.

U. S. S. Juniata.

HYGIENE.

Complement of officers, 25; of men, 215.

Air-space allowed each individual on shipboard.—Commanding officer has 4,800 cubic feet.

Wardroom officers have an average of 180 cubic feet each in sleeping-apartments. There are 2,600 cubic feet of air-space in the wardroom-country, which is occupied daily by 18 persons, giving about 146 to each individual, in addition to the space yielded by the twelve state-rooms.

Steerage-officers have in the port-steerage 882 cubic feet, after deducting the space occupied by six bunks, furniture, &c., which allows to each person, when all the bunks are occupied, 147 cubic feet. When the alterations are completed that are now being made, there will be the same space in the starboard-steerage, which is to be occupied by four warrant-officers, allowing 220 cubic feet to each of the latter. The steerage-country has a net space of 2,400 cubic feet.

The crew are berthed on the forecastle and on the berth-deck. The forecastle contains a net space of 5,940 cubic feet; 58 men are billeted there, each man having about 102 cubic feet.

Alterations are at present being made on the berth-deck, (the warrant-officers' quarters are being removed to the steerage;) when completed, there will be about 10,000 cubic feet of air-space on this deck, after deducting the space occupied by the galley, oven, cabin-stove, store-rooms, and men's bags, but making no allowance for that occupied by the men and their hammocks. On this deck are billeted 157 men; each man will have about 63 cubic feet of impure breathing-space.

Percentage of sickness and mortality.—This vessel has been in commission 10 months and 18 days. Average number of persons on board 190. There have been 124 admissions on the sick-list and 991 sick-days during the time mentioned. There has been one death on board.

Ventilation.—The cabin has one sky-light, four gun-ports, six air-ports, and doors opening on the spar-deck. A wind-sail could be used, but is seldom required.

The wardroom has two hatchways, through which wind-sails can be lowered, two doors opening into the steerage-country, an air-port in each state-room 2½ feet above the water-line, which can only be opened safely when in a smooth harbor.

The steerages have two air-ports in each and two doors opening into the steerage-country. The steerage-country has two hatchways, through which wind-sails can be lowered.

The forecastle has one hatchway, four gun-ports, and is open aft.

The berth deck has one hatchway leading to the spar-deck, directly over which, unfortunately, is stowed a collection of spare spars, and two hatchways under top-gallant forecastle. Wind-sails act imperfectly through two of them; if the spare spars were removed, the defects of the main hatch-way would be remedied. This deck has twenty air-ports, which can seldom be allowed to remain open with safety, and two ventilators communicating with its after part, which extend about 3 feet above the spar-deck; they could be extended above the ship's rail. There could be a small hatchway cut to lead to the after part of this deck from the deck above. The galley, oven, and cabin-stove could be placed on the forecastle, and the top-gallant forecastle could be extended from 10 to 20 feet farther aft, which would permit of more men to be berthed under it, and consequently fewer on the deck below.

Lighting.—Wardroom: Air-scuttles with dead lights in them

would be an improvement on the existing air-ports. Steerages require one or more deck-lights in each, and air-scuttles would be an improvement. Berth-deck requires the removal of the spare spars from off the spar-deck, the opening of a new hatchway aft, and air-scuttles instead of air-ports.

Warming.—The officers' quarters and berth-deck are heated by steam-pipes; they are sufficiently warmed. There are no means for heating the forecastle. The galley and cabin-stove ought to be placed there, and steam-pipes might be laid along its sides.

Water.—Water condensed on board is generally used. This vessel has a capacity for carrying 4,400 gallons; 250 gallons are consumed daily. The distilled water, generally, when it is used, is not sufficiently aerated. An apparatus should be placed on board by which the water would be thoroughly aerated before entering the tanks.

Food.—The navy-ration seems to be amply abundant and of sufficient variety in composition for any ordinary cruising. When this vessel was ordered to the Arctic Ocean, at a time (July) when good potatoes could not be obtained, it was recommended that canned tomatoes be provided for the crew.

Clothing.—The crew should be uniformed on board of the receiving-ships by tailors employed there to make their clothing. Only two sizes of clothing have been furnished this vessel; none suitable for boys. Working-suits of light canvass and oil water-proofs should be provided for at least one-half of the crew. Straw-hats, with open plaiting near the top for ventilation, should be worn by the ship's company in warm weather. The boots and shoes are badly made and of poor material. Good ones should be provided, if even at a higher price. The crew might be allowed to go barefoot during warm weather.

General hygienic considerations.—The bilges are not ventilated. They were in a vile condition when the ship started on her

present cruise. A large quantity of filth was removed which seemed to have been accumulating since the vessel was being constructed. It has been impossible thus far to have them thoroughly cleansed. To remedy the first defect there might be constructed a continuous box, or planking, extending throughout the entire length of the bilges, on each side of the keelson, having trap-doors at distances convenient for cleaning, and communicating at each end with a ventilator, the latter extending above the vessel's rail so as to allow a current of air to circulate through the entire extent of the inclosed bilges, as is the case in some English vessels of war. And, copying further from them, our awnings might be made tent-shaped; they would shed water better, and would not require to be housed during wet weather. In the tropics double awnings would be an advantage. Awning-curtains should be secured at least one foot above the ship's rail. If during the construction of vessels they were inspected frequently with a view to keeping them free from chips and other rubbish, much future trouble would be avoided.

CLIMATOLOGY.

No meteorological instruments are under the control of this department. A record can be furnished from the ship's log, but it would be unreliable for many reasons, some of which can be enumerated if the Bureau desires to be informed of them.

It may be of interest to know that during the cruise of this vessel in the Arctic Ocean, from July 14 to September 5 of last year, the greatest cold registered on board was 29° Fahrenheit.

MEDICAL TOPOGRAPHY.

This vessel has visited during the past year Greenland, Newfoundland, and Cuba. In Greenland it was ascertained that there were four medical practitioners living there, in the

employ of the Danish Trading Company. They resided in the most populous settlements, and visited the other villages in their respective districts once yearly, during the summer. The chief traders at all the posts had an extensive supply of ordinary medicines furnished by the company, and in the absence of the doctor they prescribed them to the ailing without stint. In each village were two or more elderly dames who had been trained by the doctor to act as midwives. A house or hut was generally set apart for the reception of patients with contagious diseases. Pulmonary diseases are most common among the natives. A specimen of the *Bothriocephalus cordatus* was seen but not obtained. Venereal diseases are extremely rare.

The Esquimaux, like our Indian race, is fast becoming extinct. No reliable statistics on this point were obtained, (our stay was too short,) but the fact was plainly discernible from the well-filled grave-yards adjoining every village, the empty huts, the numerous children, and the few aged people. The causes were readily found in their mode of living, the exposures they are subjected to while fishing and hunting, improper and often spare diet, personal uncleanliness, and, above all, the wretched huts, almost devoid of ventilation, in which they crowd together during the long winter night, keeping the temperature within at from 80° to 100° Fahrenheit, while that of the air outside would probably be registered 120° lower.

Saint John's was the only port visited in Newfoundland. It has a new public hospital with fifty beds, which is being enlarged for thirty more, and an excellent asylum for the insane. Several medical men of eminence reside there.

The "outlying ports" are not so well off, though each possesses its "*regina del cid.*" A patient of one presented himself on board with dislocation of the right humerus into the axilla, of

four months' duration; the shoulder had been blistered during most of that time "to draw it into place."

The stay of this vessel in Cuban waters was so short and under such peculiar circumstances that nothing of interest was ascertained.

Report of Michael Bradley, M. D.,

Surgeon U. S. Navy.

U. S. S. Alaska.

HYGIENE.

The complement of officers and men of the U. S. S. Alaska, second rate, is 300; air-space allowed each individual on ship-board, 125 cubic feet; monthly percentage of sickness, 6, and percentage of mortality, 0.

Ventilation of this ship, although not perfect, will compare favorably with that of any vessel in the fleet. Seven large hatches permit the wholesome air to enter and permeate every part of the berth-deck.

Lighting.—In addition to the hatches giving light, the sides of the berth-deck are amply supplied with circular glass ports on hinges, and can be used as ventilators.

Warming.—Ship heated by steam; three heaters or radiators on the berth-deck, two in the wardroom, and one in the sick-bay.

Water, potable, sometimes obtained from shore, and may either be rain or river water. Ship is provided with a distiller and aerator; can furnish from 75 to 80 gallons per hour; is preserved in iron tanks.

Food.—The usual ship's ration is abundant and of good quality. A specimen of cookery is inspected daily. The men are

furnished with fresh provisions four times weekly when the ship is in port.

Clothing is inspected before it is received by paymaster; some ready-made garments are strong and durable, while others are of inferior quality. Sheeting, satinet, and cloth, are good; shoes of the regular Navy pattern.

I would respectfully state that, owing to the limited time (two months) this vessel stopped at the ports of Spain, I was unable to obtain that information called for under the head of medical topography.

REPORT OF T. C. HEYL, M. D.,

Assistant Surgeon U. S. Navy.

U. S. S. SHENANDOAH.

HYGIENE.

The number of souls on board of this ship is 221—219 males and 2 females, and the breathing-space is distributed as follows:

Place.	No. of persons.	Cubic feet.	Cubic feet each person.
Berth-deck	127	12,258	96+
Under top-gallant forecastle	76	5,000	65+
Steerage	4	2,816	704
Wardroom	12	6,707	558+
Cabin	4	3,700	925

Ventilation.—The ventilation to the berth-deck is accomplished through 2 hatches, 2 scuttles, 14 dead-lights, (and by wind-sails,) 103. 5 square feet; to the steerage, through 4 scuttles, 1 hatch, 4 dead-lights, (and by means of wind-sails,) 98. 5 square feet; to the wardroom, through 2 scuttles, 14 dead-lights, 1 hatch, (and

wind-sails,) 73. 1 square feet; under the top-gallant forecastle, from the break of the forecastle, through 2 bridle-ports and 1 scuttle, 222 square feet.

The regular ventilation for the cabin is through 2 hatches, 10 ports, 14 dead-lights, 2 doors, (and wind-sails,) 241 square feet.

It must be remembered that the dead-lights on the berth-deck and in the steerage and wardroom are very rarely opened at sea, it being unsafe.

Lighting.—There is sufficient natural light, except on the forward part of the berth deck. I cannot suggest any remedy for this defect.

Warming.—In winter, warming is accomplished by means of steam-pipes; these sometimes leak, but such a defect must always exist in this means of warming. It is soon remedied, and as the means is free from the danger of fire, it is as good as any.

Sick.—There have been 249 admissions to the list of sick during the year, represented by 2,685 days of illness, so that each case averaged 10.7 days under treatment. The average of the ship's company for the year was 216, and the percentage admitted to the list of sick was 4.9; the mortality was 0.92 per cent.—but two cases in an average of 216 souls.

Water.—For the whole cruise water has been supplied from shore in the greater number of ports the ship has visited; it has been examined, before being placed on board, for organic matters only. If two cases of vermes (ascar. lumb.) are attributable to ova swallowed in water, they are the only cases where this element has been the vehicle of disease. Water prepared by the process of condensation has been used likewise. There can be no question as to its superiority when aerated.

Food.—The food in port has been fresh, abundant, and well selected; at sea, the usual ration. It has been reasonably well

prepared, and nearly all consumed; naturally there is some waste, unavoidable perhaps.

Clothing.—Of the clothing, all parts seem suitable and serviceable, except the cap, and here, as has been observed by other authority, a visor would be an advantage as well as an improvement. I have heard no complaint of the weight of the caps, but they certainly appear to be ponderous and crushing, especially on the boys.

Hospitals.—Of continental hospitals, I have long entertained the opinion that they were inferior to our own in the two great essentials of nursing and nourishing food.

SANITARY REPORTS.

SOUTH ATLANTIC SQUADRON.

1873.

SOUTH ATLANTIC SQUADRON,

1873.

REPORT OF W. T. HORD, M. D.,

Medical Inspector U. S. Navy, Surgeon of the Fleet.

U. S. S. LANCASTER.

HYGIENE.

Daily average of officers and men during the year 1873 was 317; daily average sick, $10\frac{108}{365}$; deaths, 4, viz: rubeola, 1; effusion on the brain, 1; typhoid pneumonia, 1, and typhoid fever, 1; percentage of sickness, .03248; of deaths, .0126.

Ventilation of the ship is by means of wind-sails, and can be made tolerably good with the exception of the sick-bay, which is the worst-ventilated place in the ship. There is no hatch through the spar-deck by which a wind-sail can supply the sick-bay with fresh air.

I have recommended several times that iron ventilators should be made for that purpose, running through the spar-deck down to the sick-bay, but no attention was paid to the recommendation. Owing to defective ventilation we had an epidemic of typhoid fever at the commencement of the year, from which we lost two men.

Lighting.—Artificial light is necessary at all hours of the day to enable one to read on the berth-deck.

Warming.—There is no apparatus for heating the ship. An apparatus for that purpose is a very essential part of a ship's equipment, even in the tropics. A ship's hold should be dried twice a month, especially if all the decks are deluged with

water every day, as is the custom of the service. The berth-deck should always be covered with shellac.

Water on the Brazil station is good except at Montevideo, where the city is supplied with water from the Saint Lucia River, a black, sluggish, stagnant stream. Montevideo is the only place where we used distilled water.

Food is good, and the ration is probably the most abundant and best furnished to the navy of any nation.

Clothing good.

I would suggest that the Navy Department make a code of sanitary regulations, and make it obligatory upon commanding officers to observe them, for too often they consider any sanitary recommendation, however important, and however little it may interfere with the routine of the ship, as an unwarrantable interference, and disregard it. One of the most efficient means, in my opinion, to keep the men in good health within the tropics is frequent bathing. I am convinced that a number of men sent home from this ship invalided would have recovered on the station if there had been facilities for bathing.

Regardless of my repeated recommendation, I never could get a lower studding-sail placed in the water so that men might bathe who could not swim. Not only the cleanliness of the crew would be conducive to health, but the tonic effect of the cold water would keep up their vigor and strength even during a long sojourn in the tropics.

Since 1850, yellow fever has become endemic in Rio de Janeiro. Elephantiasis of the Arabs is supposed to affect one-tenth of the entire male population. I am told that before the country was cultivated as well as it is now, the disease was more common, and the termination more rapid. It is not confined to the poor, badly-fed, and exposed portion of the population, but to all classes, rich and poor alike. There appears to be no cure for this disease except to leave the country during its early stages.

MEDICAL SCHOOLS.

There are two academies of medicine in Brazil, one in Rio de Janeiro and the other in Bahia.

It requires an attendance of six years to entitle one to graduation.

The first year is devoted to anatomy, physics, and chemistry.

The second year, anatomy, physiology, botany, zoology, and organic chemistry.

The third year, physiology, histology, and pathological anatomy and general pathology.

The fourth year, medical pathology, (first part,) surgical pathology, and obstetrics.

The fifth year, medical pathology, (second part,) topographical anatomy and surgical operations, materia medica and therapeutics.

The sixth year, pharmacy and forensic medicine.

The students of the third and fourth years perform surgical operations under the direction of the professor of surgery.

There are only two charity hospitals in Rio de Janeiro, the Misericordia and the Nossa Señora de Sande, (Our Lady of Health.) There are a great number of private hospitals, which are dirty, badly located, and is deficient in ventilation.

The Misericordia is a fine hospital, built of stone, of the pavilion style, well located on the bay, and is capable of containing about fifteen hundred beds. Everything is very clean and neat, the floors are waxed every day, the diet is good and abundant, and it will compare favorably with any hospital I have ever seen.

All the medicines used in the hospital are made and dispensed by seven Sisters of Charity.

The other charity hospital is for the reception of patients affected with small-pox and other infectious eruptive diseases. It

is also well located on a high hill on the bay, is clean, well ventilated, and well cared for.

All the hospitals at Bahia are small, dirty, badly located and ventilated. They do not isolate cases of small-pox, but receive them into all the hospitals.

There are but two hospitals in Montevideo, the "City Hospital," which is a filthy place, and badly managed, and the "British Hospital," which is a small affair, capable of containing fifteen or twenty patients; it is well located and clean, but the construction is very bad, and the ventilation is defective.

Brazil is the only civilized country that does not give the right of sepulture. After a man has been buried five years, the body is exhumed, and, if there is no one to claim it, it is burned, and the ashes thrown into the bay.

This is the fate of all officers and men of the Navy and merchant-marine who die at Rio de Janeiro. Rio is the headquarters of the squadron, and is the stopping-place for nearly all naval vessels going to and from the Pacific and China stations, and there are a large number of merchant-ships trading there.

Our Government should have a burying-ground for the men of its naval and commercial marine, such as every other nation possesses.

REPORT OF A. A. HOEHLING, M. D.,

Surgeon U. S. Navy.

U. S. S. MONONGAHELA.

HYGIENE.

Complement of officers and men, 257; average complement since commission, 245; cubic air-space allowed: wardroom, officers, each, 441⅓ cubic feet; starboard-steerage officers, each,

145 cubic feet; port-steerage officers, each, 271½ cubic feet; steerage-country, for each person, 271½ cubic feet; crew on berth-deck, full watch on duty, each, 159¼ cubic feet; crew on berth-deck, quarter watch on duty, each, 95 cubic feet; crew under forecastle, each, 184 cubic feet.

In warm weather many of the men sleep on deck, and those quartered under the forecastle have the advantage of communication with the open air, as no curtain is then used.

Percentage of sickness since commission, 2.25.

Ventilation.—The ventilation is fair in the wardroom; moderately good in the steerages; bad on the berth-deck.

The berth-deck is very hot from the galley fire, and the ventilators are in the way of the forward pivot-gun; they also open inconveniently into the issuing-room and dispensary, and when used allow water to run into those places. The ship has a bad bilge, and many portions of it cannot be reached with brooms and scrapers for want of room. The foul air reaches our state-rooms and the berth-deck through spaces left between the knees and deck; by plugging these with oakum we have partly removed the evil and diverted the foul gas into its proper ventilators on the upper deck. Disinfectants give only temporary relief. Every portion of a ship's bilge should be accessible. When under steam we perceive no foul odor; and I would respectfully suggest an arrangement of pipes discharging from the bilges into one pipe placed through the galley fire and funnel, somewhat on the plan of Mr. Sutton, as described in Parke's Manual of Practical Hygiene, page 123, second American edition.

Lighting.—The lighting is as good as usual on ships of this rate.

Warming.—The warming is very good in all parts used as quarters; steam-pipes convey the heating-vapor.

Water.—The water is generally good. In a sea-way the water

becomes charged with particles of rust. The iron tanks used in the Navy would answer better if lined with porcelain, as is the case with iron preserving-kettles.

Food.—The food is good in character and preparation, and the quantity is sufficient.

Clothing.—The clothing is good in a hygienic point of view, excepting the Navy cap for enlisted men, which should not rest on the top of the head without air-space.

All the air-ports and deck-lights leak, and the drain-cups do not carry off the water freely; this adds to the dampness of the quarters occupied by officers and men, and ruined some of their clothing when at sea. On account of the bad bilge, and the existence at Rio of yellow fever, several cases having been reported ashore and afloat within the last week, I have exceeded the "allowance" of disinfectants in my requisitions.

MEDICAL TOPOGRAPHY.

Rio de Janeiro is hot and damp; the temperature between seasons varies from 16° to 32° centigrade. The people are undersized and delicate in appearance. Rio has eight civil hospitals, a naval hospital, military hospital, lunatic asylum, foundling asylum, two orphan asylums, an asylum for deaf and dumb children, and one for blind children; also a quarantine hospital, which is only opened when actually required. The Santa Casa da Misericordia is the largest of the hospitals. It has accommodations for 1,100 patients, is kept very clean, and is under the care of the sisters of the congregation of St. Vincent de Paul. The poor receive treatment gratis. This hospital also manages four free dispensaries. During the "compromissorial" year of 1872–'73 14,539 patients were treated in this hospital; 10,526 of these were discharged cured, 2,946 died, and 1,067 remained under treatment. At the lazar's hospital for elephantiasis 79 patients were cared for during the

same period; they comprised 47 male adults, 9 male minors, 18 female adults, and 5 female minors; of these 7 men and 4 women died. At the D. Pedro Second lunatic asylum 393 cases were treated during the same period.

In a population at Rio, variously estimated at from 290,000 to 600,000, there were 90,814 deaths during the ten years from 1862 to 1872. Of these 6,225 were still-born; 1,292 were caused by violence, suicide included; 792 died of old age; 6,346 of tetanus neonatorum and other diseases peculiar to early infancy; 3,508 of variola; 5,514 of yellow fever; 603 of cholera asiatica, which they call cholera-morbus here, but the descriptions of which are such as to leave no doubt the former disease is meant. The fatal cases of cholera mostly occurred among the slaves and very lowest classes; it made its first appearance in 1855.

The yellow fever made its first appearance in 1850, and the above-named fatal cases of that disease are said to have occurred in 1869, 1870, and 1872.

From January 31 to July 31, 1873, 3,634 died of yellow fever; of these 192 died at the naval hospital, Santa Isabel.

There is now some yellow fever here, seven cases having been reported on an American ship and a few on shore.

I believe the disease to have become endemic here, and the very bad and deficient sewerage, as well as the foul odors in the city, the use of large pots instead of earth-closets, and the heat and dampness, are sufficient to account for the prevalence of the disease. Before 1850 a smaller population did not overburden the sewers; probably the seeds of the disease were also imported at that time, but they found a congenial abode here.

The small-pox destroyed 1,021 lives in 1872; a few cases were reported on our arrival here, December 22, 1873, but about the end of the year I could hear of no more cases.

Native statistics show a liberal share of venereal diseases, but naval crews have been remarkably exempt of late at Rio.

Our ship has been giving liberty, but not a case of venereal disease has appeared; of course the time to pronounce them out of danger has not arrived yet. I understand all the men-of-war have had the same experience here. The surgeon of the British store-ship informed me that during the year just passed his ship, the Egmont, had among her crew but one case of syphilis and one of gonorrhœa, which originated at Rio.

Pernicious fever and tetanus neonatorum occupy prominent places in the records of death on shore; but sunstroke appears to be of very rare occurrence. I find no deaths from that disease among the statistics which I have been able to examine.

Quinine the native physicians regard with great favor in the treatment of many diseases, and they give it by enema when the stomach rejects it. Before surgical operations a full dose is often used.

There are two faculties of medicine in Brazil; one at Rio and one at Bahia. These also give special courses in pharmacy and in obstetrics. The course for medical students is six years, for apothecaries three years, and for midwives two years. The preliminary requirements and curriculum are quite complete, apparently much more so than in our medical schools. At Rio, 470 students of medicine matriculated in 1872, and 52 received the degree of M. D. At Bahia, in the same year, 193 matriculated, and 23 received the degree of M. D. The government allows these two faculties £21,691 annually. The library of the faculty of medicine at Rio comprises 5,200 bound volumes and a large number of pamphlets; it has 3,000 readers annually.

There are boards of health and vaccination at Rio and in the provinces.

Three medical periodicals are published at Rio, one at Bahia, and a pharmaceutical journal at Rio.

REPORT OF J. A. HAWKE, M. D.,

Passed Assistant Surgeon U. S. Navy.

U. S. S. WASP.

HYGIENE.

Complement of officers and men, 74. The total amount of air-space is about 14,200 cubic feet, distributed as follows, viz: Berth-deck, 5,800; steerage, 2,000; wardroom, 3,900; cabin, 2,600.

The berth-deck, at night, is occupied by about forty of the crew, thus giving an allowance of 145 cubic feet of air-space to each person. The remainder of the crew sleep on deck and under the forecastle.

The steerage is occupied by one officer while the ship is in port, and two when at sea; an air-space of 1,000 cubic feet to each person.

The wardroom, during the past year, has been occupied by seven officers; an allowance of 560 cubic feet to each officer.

The cabin is occupied by the commanding officer; at times, also, by the admiral commanding the station, and the United States minister to Uruguay, who occasionally require the services of the vessel to convey them to Paraguay.

In addition to the above, there is a small room on the spar-deck used by the executive officer, containing an air-space of 450 cubic feet.

Ventilation.—For ventilating and lighting the berth-deck, we have eight circular air-ports, 7 inches in diameter, and two hatches, one 7 feet 6 inches by 6 feet 7 inches, and the other 7 feet by 3 feet. In the steerage there are five air-ports 7 inches in diameter, and a hatch 3 feet by 4 feet 6 inches; in the wardroom eight air-ports 7 inches in diameter, two deck-ventilators

12 inches in diameter, and one hatch 6 feet 10 inches by 5 feet 4 inches. The cabin is well ventilated and well lighted. During pleasant weather, the air-ports are always kept open, and wind-sails set both forward and aft. There are no special arrangements for heating the ship forward. The wardroom and cabin, during inclement weather, are warmed by small stoves.

Water.—Water is obtained from the shore, and is the same as that used in the city of Montevideo. It is usually clear, without odor, has a pleasant taste, and answers all the tests which we have at command on board ship. On one or two occasions it has been rather turbid, and we have found it necessary to filter it through sand. The supply is unlimited, and it it is preserved in iron tanks, which from time to time are carefully and thoroughly cleansed.

Food.—The food supplied is of good quality. The crew are robust and well nourished. During the greater part of the time embracing our stay in port fresh provisions are supplied four times a week. The cooking is done by means of a French galley, placed on the berth-deck.

Clothing.—The clothing is durable, and of good quality. The shoes are principally made to order. The underclothing is too heavy in texture for the climate during the summer-months. The caps are objectionable, especially when worn under exposure to the sun.

Percentage of sickness and mortality.—The proportion of cases admitted to the whole number of persons on board ship was 0.77, or each person was on the sick-list $\frac{56}{72}$ time during the year.

MEDICAL COLLEGES; HOSPITALS; PREVALENT DISEASES.

There are no medical colleges in the republic of Uraguay. The only municipal hospital in Montevideo is the Hospital de la

Caridad, which is maintained largely by the Caridad lottery, and governed by a committee of mercantile gentlemen, appointed by the municipality or *junta economica*, a member of which is designated president of the board. It is situated in the south-western portion of the city, in a densely-populated district, inhabited principally by the lower orders. The building is of brick, two stories in height, and is built in the form of a square, inclosing an open space or court embellished with flowers and fruit-trees, and subdivided by a ward extending transversely. It contains fourteen large wards, and has accommodation for four hundred patients. The wards are irregular in size, 18 and 21 feet high, connected by covered corridors, facing the court; are well lighted, fairly ventilated, with smooth walls and high windows, brick and marble floors, and are classified in the following order: male, female, medical, surgical, chronic, prisoners', venereal, small-pox, eye, and children's. The bedsteads are of iron and are fitted with curtains. The bedding consists of an under mattress of straw and an upper one of wool, white sheeting and red blankets. In the prisoners' and military wards, surgical and medical cases are treated indiscriminately. In addition to the fourteen large wards, there are seven small or particular wards for the use of private patients. These pay one dollar a day; all others are treated gratuitously. The average cubic air-space is about 1,100 feet for each bed.

Adjoining the surgical ward is the operating-room, of suitable size, well lighted, and thoroughly equipped for the purpose. The water-closets are offensive, insufficient in number, and badly attended to, the great defect being in the arrangement of the water-pipes, as drainage is good and supply of water throughout the whole building abundant. Douche, shower, and cold-water baths are conveniently arranged for use by the patients.

Post-mortem amphitheater is ample and well lighted.

Dispensary large and elegant, and in charge of a qualified male dispenser and assistant. Linen-room in excellent order, and of ample size. Kitchen in basement, clean and spacious. No dining-room. Diet, full, middle, and low, adapted to the condition of the patient. No laundry, washing being done by persons employed outside. The general cleanliness of the entire building is very fair. The water supplied to the hospital is that in use in the city generally, and is brought from the Santa Lucia, a small river emptying into the Rio de la Plata, a few miles to the westward. It is conveyed in iron pipes a distance of nineteen miles. There are no means of heating the building, but it is well supplied with gas for lighting purposes.

Patients are admitted on the recommendation of a medical practitioner, police official, or foreign consul; cases of recent injuries are received at all hours. Contagious and infectious diseases excluded, with the exception of small-pox, persons affected with this disease being treated in the ward set apart for this purpose in the basement; an unhappy arrangement and involving an unnecessary risk. The staff is composed of seven physicians and surgeons, none of whom reside in the building. The Sisters of Charity have general superintendence and administer the medicines. In the surgical department there are eight *practicantes* or dressers. All the large wards have two regular attendants. The most common diseases are phthisis, pneumonia, diarrhœa, dysentery, rheumatism, hepatic diseases, scrofula, and syphilis. Malarial fevers infrequent. Typhus rare. Injuries are common, there being an average of two admissions daily for punctured and gunshot wounds. There is no provision made by the government for treating outdoor patients, hence the tendency to overcrowd the hospital with cases of a trivial nature. The daily average of patients during the past year has been 350; number of admissions, 3,016; deaths, 343; remaining under treatment, 350.

There is also a small British hospital for the reception of patients from merchant-vessels, foreign men-of-war, English residents, &c., situated near the river, in the southern portion of the city. It is one and two stories in height, quadrangular in form, and is arranged so as to inclose an open space or court, with which the wards communicate. There are five general wards, and particular wards for nine patients. The floor is of wood, the walls plastered, the roof tiled, the ceilings moderately high and the lighting and ventilation fair. The bedsteads are of iron, the mattresses of corn-husk and wool, and the coverings are gray and white blankets with colored spreads. The amount of cubic air-space has never been estimated. Dispensary and kitchen is in fair condition. No dining-room or arrangements for heating water. Baths and water-closets are imperfect, but new ones have been projected and will be built in a short time. It has accommodation for fifty patients, and now has a daily average of thirty. This hospital is sustained chiefly by voluntary subscription. Destitute Englishmen are treated without charge. Seamen and others are required to pay fifty cents a day; private patients $1.50 to $3 a day, according to circumstances. All contagious and infectious diseases are received, except yellow fever and cholera, the patients being isolated as well as the arrangement of the wards will admit. Disinfectants are largely used both during and after the treatment of these diseases. The diet is full, middle, and special, as may be required. During the past year there have been 374 admissions, with 13 deaths; remaining under treatment at the end of the year, 30. The patients suffer principally from rheumatism, pectoral diseases, diarrhœa, syphilis, and injuries.

Montevideo has been healthy and free from endemic or epidemic influences during the past year. Cholera is now raging in Buenos Ayres, one hundred miles distant, with an aver-

age of one hundred cases daily and about thirty deaths, but no cases have yet presented themselves here. A quarantine of forty days is imposed upon vessels arriving from the above port. Vessels from Rio de Janeiro, where yellow fever is said to exist, are quarantined for twelve days, computing from the time of their departure from that place.

SANITARY REPORTS.

SOUTH PACIFIC SQUADRON.

1873.

SOUTH PACIFIC SQUADRON,

1873.

REPORT OF J. C. SPEAR, M. D.,

Surgeon U. S. Navy.

U. S. S. OMAHA.

HYGIENE.

The complement was 28 officers and 250 men, but the average number on board for the year was only 24 officers and 218 men. The cubic air-space allowed to each officer, not including the commanding officer, was 336 cubic feet, and to each man 113. The sick-rate for the year, including every person excused from duty, was 2.5 per cent.; and the death-rate was 4.13 per 1,000, or, 1 death in every 242 persons; and the invaliding-rate was 33 per 1,000, or 8 in every 242 persons.

Ventilation.—The ventilation of the berth-deck, including the wardroom, steerages, store-rooms, sick-bay, and the like, was accomplished, as shown by the following: Air-space on berth-deck, 35,913 cubic feet; hatch-area leading to berth-deck, 205 square feet; air-port area opening on berth-deck, 18.7 square feet. The air-ports could not be left open at sea. In warm weather and at sea, whenever it was necessary for ventilation, wind-sails, five in number, were set. There is also a 12-inch ventilator leading from the top-gallant forecastle to the sick-bay and the yeoman's store-room, and two others, 9 inch, leading from the poop-deck, one to the wardroom-pantry and the other to the shaft-alley. Two Thiers's automatic pumps were placed on board before the ship was commissioned, and over a year's experience with them, in a variety of climates, has demon-

strated their great value. They always work well at sea, and oftentimes in port there is quite enough motion on the ship to make them pump. One is fitted to pump the foul air from the shaft-alley and yeoman's store-room, and the other to pump the engine-room bilge-water. The ship making but very little water, the bilge is usually kept well pumped out by the deck-pump, and the automatic pump is left dry and free to pump the foul air in the bilges, and in this way renders, no doubt, an important sanitary service.

Lighting.—The lighting of the ship is effected by sixty air-ports, each 7½ inches in diameter, eight hatches, and a large engine-room and fire-room hatch.

Warming.—The warming was done by steam-heaters—one in the cabin, two in the wardroom, one in each steerage, three on the berth-deck, and one in the sick-bay. They answer their purpose very well.

Water.—The water used was either distilled or obtained from shore. It was the practice always to use the former whenever the purity of the latter was in the least doubtful. Distilled water was used 205 days and shore-water 160 days in the year.

Food.—The food served out was the ordinary Navy ration for sea and port, and, in general, was of excellent quality.

Clothing.—The clothing was that furnished by the Bureau of Provisions and Clothing and that purchased on the station. It was of good quality and well adapted to the climate.

General hygienic considerations and suggestions.—Davidson's water-closet, placed in the sick-bay, has worked very well at sea, and has proved a great convenience and of incalculable service to the sick. I think every ship, however small, should be fitted with one somewhere on the berth-deck for the use of the sick. Ours was badly made, and the tank and pipes leaked a good deal from time to time. The present location of the water-closets for the crew, in the head, is objectionable on the score

of health. In rough weather the closets are always flooded, and it is not possible to use them without getting wet through and through. And then, in cold or rainy weather, to turn out of a warm hammock and go there, perhaps half dressed, subjects the sailor to a great deal of exposure, and gives, no doubt, origin to many attacks of pneumonia, rheumatism, and dysentery. I would suggest that, whenever it is practicable, the closets be placed under the top-gallant forecastle. The old objection of bad smell in warm weather no longer holds, or it should not, with the disinfectants of the present day at our command.

Commodore Le Roy told me last year that the board of inspectors was earnestly considering the matter of moving the sick-bay in the vessels of the Navy from its present objectionable location to a more eligible one. The importance and necessity of doing so is, I presume, very generally admitted in the service, but to find an available place for it presents some difficulties. I would suggest that in single-deck ships, like this one, the port-steerage, abandoned by the assistant engineers, might be, if enlarged, a fit and proper place for the sick. An oil-cloth for the deck of the sick-bay is badly needed, and I think it would be better to paint the sick-bay an oak or buff color instead of white. This would render unnecessary a great deal of the present holystoning and scrubbing paint-work, which disturb the sick and make the place damp and unhealthful. I suggest that iron bedsteads, adapted to use on board ship, replace the hospital-cots. This has already been done on board many of the vessels of the royal navy. Early in the cruise our medical store-room, located in the fore-passage, was burglariously entered and a large sea-chest belonging to one of the medical officers, in which wines and liquors for the sick were kept, was broken open and nearly all its contents stolen. It has not been considered safe since that occurrence to store any more liquors there. It seems to me it would be better to have

the medical store-room under the wardroom, or at least a small locker there for the wines and liquors.

One day in Callao, where the climate is very damp, I happened to be in a drug-store where a lot of surgical instruments, just out from England, was being unpacked, and was struck with the fact that all those in cases lined with buckskin were rusty and damaged, while those in velvet-lined cases were in perfect order. I am inclined to the opinion that the surgical instruments of the Navy would rust less if kept in velvet cases.

I think the matter of *subsisting the sick* on board our cruising-ships, as at present done, is very unsatisfactory. The allowance of articles for subsistence is both insufficient in quantity and variety. It is not the practice any longer to stop the rations of the sick, and as they are not eaten, there is a waste of the public stores. But even if the rations were stopped, as the regulations permit, it is not possible to draw their value in money at the time, and with it purchase suitable food for the sick; nor is there any other fund directly available for this purpose. And then the nurses, or baymen, are not competent cooks, nor is it reasonable ever to expect them to be with the small pay they get. The mess-cooks for the crew are hardly competent either; and, even if they were, they are not and cannot be sufficiently under the control of the medical officers to be depended on to do the cooking for the sick. It is often the practice, in default of anything better, to subsist the sick—I mean those who absolutely require it—on donations from officers' private tables, or by the surgeon making an arrangement with the caterer of some officers' mess to do so for a certain daily price per man; either of which is, of course, objectionable, and for the latter there seems to be no authority by regulation. It is a matter that presents some difficulties, but I do believe it is possible to rectify it, or at least to greatly improve on the present system, and without much additional cost to the Navy.

MEDICAL TOPOGRAPHY.

Puná, (Ecuador,) on a large island of the same name, has a population of 400, half of whom are pure Indians and the remainder mixed-bloods. From our own observation the mean day-temperature, from July 15 to July 21, was 76½° F., and the mean night-temperature 73⅓° F. There was very little dew, and the sky was generally overcast in the day-time. Woolen clothing and a heavy blanket at night were necessary. The dry and rainy seasons are the same here as in Guayaquil, but it rains less here. There are no mosquitoes, except in the month of May. I could not hear of the prevalence of any form of malarial fever at any season. The air is dryer and cooler than in Guayaquil, and Puná is on that account resorted to by many invalids of Guayaquil and the interior. *Morro Point* and *Prosorja*, a short distance from Puná, near the sea-shore on the mainland, enjoy an extended reputation for the cure of consumptives. Of late strangers from Peru and Chili have resorted to this climate when affected with phthisis.

On the island there is good shooting. Deer are plentiful, and so are pigeons, especially on the borders of a fresh-water lake five miles from the town. We hauled the ship's seine every day and caught a quantity of corvincas, (*Pristipomas*,) the best dinner-fish I ever ate, large crookers, and very delicious shrimp. Beef of fair quality, good poultry, sweet potatoes, tomatoes, and melons, in sufficient quantity to supply the ship's company, were obtained on the island. The water-supply is very limited, and watering ship here would be a tedious and difficult undertaking.

Guayaquil has a population of 22,000. The rainy season begins in January and ends in May; and during the other months in the year it never rains. The mean day-temperature in the rainy season is 82° F., and the night-temperature is 78°

F.; the mean day-temperature in the dry season is 78½° F., and the night-temperature is 70° F. In May, June, and July there is a great deal of remittent and intermittent fevers, generally of a mild type. The congestive chill is very rarely met with. The whole number of deaths in 1872 was 2,031, a year, free from any epidemic, which makes the enormous *death-rate of* 92 *per* 1,000. The leading physician of the city was, however, very particular in stating that the large death-rate was rather apparent than real, being due in a great measure to the fact that the country people, when very ill, repaired to the city for medical advice, and of course often died there. The greatest number of deaths occur in September, and the least in January. Hospital de Caridad is a municipal institution; contains 300 beds, and its returns for May and June, current year, show a death-rate, of all persons treated, of 15 per cent. The American consul informed me he did not send our sick sailors to this hospital, but always employed a private physician to attend them either on board or in some private boarding-house. Many of the houses are elevated above the ground, 8 to 12 feet, on wooden piles, in order to prevent the ingress of reptiles and insects, and also to avoid the dampness in the rainy season. The market is well supplied with good beef, poultry, game, and vegetables. The potato does not grow along the coast, and has to be transported on mules from the interior, and is in consequence very dear, $6 a hundred-weight. The water-supply is at present bad. In the rainy season it is taken from the river in front of the city, and in the dry season, when the salt tide-water goes higher up, it is brought down the river in tanks from a point fifteen miles above. An American engineer is now employed in building water-works for supplying the city with pure water, and it is estimated they will be finished in two years. Pulmonary consumption is very prevalent, but in the absence of any statistics it is not possible to estimate its death-

rate, but all agree that it is very large; more so, perhaps, than that of the New England States. This prevalence of consumption is confined, however, to the low lands along the coast-line and water-courses. In the great Andean Valley there is very little of it. Physicians are divided in opinion as to the best climate to send their consumptive patients. Some advise the elevated cities of Cuenca and Quito, and the others the sea-shore resorts near Puná already mentioned. They do not appear to make any selection, but send all cases, whether hemorrhagic or not, to the sea-side or to the mountains, as each physician believes to be best. One of the doctors who habitually sends all his patients to the sea-side told me he knew of many sad deaths which occurred suddenly by the road-side of hæmoptysis, *en route* to Quito, where the road, at one point near the base of Chimborazo, reaches an elevation of 14,500 feet above the sea. A railroad through a lower pass is being constructed, and will be finished by the 1st of January, 1875, when one can travel to Quito with very little danger, even if phthisical.

Coquimbo (Chili) is a town of 3,500 inhabitants, and is the port and anchorage of La Seréna, eight miles distant. In the town and near it are two large copper-smelting works, in which 1,500 workmen are employed, many of whom are foreigners. There is no hospital in the town, and the sailors who fall ill have to be sent to La Seréna for hospital-treatment. Dr. Tate, an English physician, is located here. The water-supply is abundant and of good quality for ship's use. It is brought in an aqueduct from a mountain-stream fifty miles in the interior. The market is very good, and provisions cheap. The vegetables and beef are the finest that I have met with in South America. The town is built on the side of a rocky, barren ridge, composed of granulite, with here and there deposits of modern limestone, and the location is no doubt a very healthy one.

There is very little venereal disease; much less than in Valparaiso. For the above reason, in addition to the advantages of the harbor as a safe anchorage in the season of northers, it is one of the very best places for our ships on the station to pass the winter-months. I made careful inquiries among the workmen in the copper-smelting works in relation to the so-called copper-colic, but could not hear of a single case, nor have I ever been able to learn of a single case of the disease among the thousands of workers in copper in Chili. As to whether the Chili copper-workers have enjoyed a greater immunity than other people in the same vicinity in epidemics of cholera, I have not been able to obtain any reliable information.

La Serćna contains 13,000 inhabitants. It is located on a slight elevation on the left bank of the river of the same name, a few hundred yards from the sea-beach. Near the city there is a good deal of low marsh-land, and in the neighborhood there are some of the finest pasture-lands in Chili. The climate, from March to September, is damp and chilly, and the sky is nearly all the time overcast. Malarial fever of a mild type prevails toward the close of summer, and pulmonary consumption is also very common. The records of the city hospital for May, June, and July, current year, show 69 deaths, 29 of which, or 42 per cent., were due to pulmonary consumption. The hospital has 200 beds, and there were 203 inmates. The death-rate of the hospital was 15 per cent. The building is one story, with pavilion-wards, surrounding a large *patio*, or court-yard, filled with trees and flowers. It is managed by French Sisters of Charity, one of whom acts as governess and another as apothecary. The physicians and surgeons are natives, and visit their wards once a day. Every part of the institution was clean and in excellent order. It is here that merchant-seamen from the port of Coquimbo are received gratis and are carefully attended. It is true all the foreign shipping pay hospital-dues, which entitle the crews to hospital-accommodations at all times.

The resources of the hospital are:

Grant from the city of La Seréna, annually	$14,000
Private donations, annually	1,000
Hospital-dues from foreign shipping, annually	800
Total	15,800

Valparaiso has 76,505 inhabitants, according to the census of 1871, 5,008 of whom are foreigners. The citizens of the United States number 320. The city stretches along the shore of the bay for three miles, the interior being so hilly and broken that the city could not extend in that direction. Some of the eligible hill-sides are covered with private dwellings. The Cordillera or great Andean Chain to the eastward is in plain view, and the superb peak *Aconcagua*, perpetually covered with snow, is a marked feature in the beautiful view one enjoys from this locality. The underlying rock-formation is gneiss, injected in many places in a very singular manner with large veins of quartz.

In June, July, and August the harbor is an unsafe anchorage on account of the northers that prevail then, and during the other nine months of the year strong southerly winds blow nearly every day, and, coming from the direction of the sandy barren hills behind the city, oftentimes fill the streets and houses with dust and sand. Though these winds are exceedingly unpleasant, there is little doubt that they are beneficial to the health of the city, both by changing frequently the confined, fetid atmosphere in the deep, narrow *quebradas*, overcrowded with squalid dwellings, and by spreading over the filth and excreta, in the same localities, a layer of dry earth every day. In some portions of the city brick sewers have lately been laid down, but by far the larger part of it has no other than surface-drainage. The water-supply is at present

both insufficient in quantity and impure in quality. It is obtained from wells about the city, and also from the rain and small rivulets among the hills just in rear of the city. The water from the latter source is the best for drinking purposes, and that from the wells should never be used on board ship, for it is almost sure to produce diarrhœa and dysentery among the crew. In a few years the city will have a good water-supply, no doubt, for the municipal authorities are earnestly at work selecting a plan from among the many submitted by engineers and others for bringing the water from a distance.

In general the city is kept clean, but the bad drainage, the crowded, squalid dwellings in the narrow *quebradas*, with the impure water supply, are serious drawbacks to the general health of the inhabitants. This is well shown by the annual death-rate, which is 48 per 1,000 in years free from epidemics. Last year, with an epidemic of small-pox, it reached 93 per 1,000. Valparaiso is the most unhealthy city or town in Chili. The mean death-rate for the whole republic was in 1871 25 per 1,000, and in the capital, Santiago, it was 33 per 1,000. There are no statistics which exhibit the relative number from different diseases except those furnished by the hospitals. In Chili 35 per cent. of all the deaths in public hospitals are due to pulmonary consumption, and in the Hospital de Caridad of Valparaiso 39 per cent. of all the deaths is due to the same disease. I believe it is not generally known at home that consumption is so common on this coast. All along the coast-line, extending fifty miles in the interior, from Chili to Ecuador, I have seen myself or heard of this disease as prevailing to an alarming extent. Many persons suppose that the climate of the coast is dry and stimulating, perhaps from the fact that so little rain falls. This is of course a great mistake. In the trade-wind belt, which includes the greater part of the coast-line of Peru, there is absolutely no rain, but the climate is the dampest,

night and day, I have ever seen in any part of the world. But fortunately at the same time it is cool, the thermometer rarely rising above 70° or 75° F. On board ship at night, winter and summer, from the equator to Cape Horn, I have never been comfortable in bed with less bed-clothes than two heavy woolen blankets. Four or five hundred miles from the coast this cool, damp atmosphere ceases, and the balmy, temperate, dry climate of the Pacific Ocean begins.

Valparaiso enjoys the unenviable reputation among mariners of being infected with venereal diseases to an unusual extent, but from my own observation, rather limited to be sure, I am of the opinion that they are less prevalent than in our own seaboard cities. Prostitution is not subjected to any sanitary regulations, but the women generally reside in their own houses or rooms and do not congregate in large establishments as in the United States, and this circumstance, it is believed, tends to make the women less depraved and sottish, and in this way has the effect of diminishing the spread of these diseases. Our ship's company, 242 in number, after general liberty of thirty-six hours, returned only three chancroids, one chancre, and three gonorrhœas.

Dysentery is very common, and foreign residents often die of it. In its treatment the physicians resident here are *unanimous in their praises of large doses of ipecacuanha.* The common people, often unable to get medical advice, employ themselves ipecacuanha in large doses when they have dysentery, and among them it has come to be generally known as the favorite remedy in this affection.

El Hospital de Caridad, situated in the central part of the city, is both a municipal and military institution, and also receives occasionally the sick from the shipping in the bay. There are two principal buildings, one old and the other new. The first is constructed on the pavilion plan, with one story; and

the wards, ten in number, are separated from each other by pretty *patios*, planted with trees and flowers. The windows are small, and there is no ventilation at the roof, and the wards were generally overcrowded. There is no separation of the medical and surgical cases. The wards are under the immediate charge of French Sisters of Charity, and everything here, as I have always found it under the direction of these charitable and excellent women, was in perfect order. The wards in the old building are for males, and the large military and naval ward is also here. In the new building the females are accommodated. This structure is three story, with a wide, long ward on each floor, with a balcony communicating. Each ward is lighted with gas, supplied with a hydrant, water-closets, and bath-rooms, and is also fitted with the modern improvements in hospital ventilation. There are 460 beds, and many deserving applicants for admission are refused for want of more accommodation. The death-rate of the hospital is 22 per cent.; *it is more than four times as great* as that of the English hospital of Valparaiso. All foreign shipping is taxed ten cents a ton, payable only once in the year, for hospital-dues, and the institution is largely supported from this source; but the foreign seamen, it seems, are not entitled to accommodation at all times, but have to wait their turn, with the sick of the city, for a vacancy to occur. The upshot of it is that nearly all the American merchant-seamen are sent, with the British, to the English hospital, where, of course, they are required to pay extra.

The English hospital is a large two-story brick building, originally constructed for a private residence, at a cost, it is said, of $200,000. It is pleasantly located on a hill-side, 500 feet above the sea, overlooking the city and bay, and is easily reached by a good carriage-road. There is an acre or more of well kept grounds, planted with ornamental trees and flowers. The hospital is owned and conducted by Dr. G. F. Cooper, an

English surgeon. The admiralty has designated it as the "sick-quarters" for the British naval force on the station, and has a contract with Dr. Cooper to that end. The contract fixes the daily charge for quarters, food, medicine, attendance, and professional care at $3 for officers and $1.50 for men. In case important surgical operations are performed additional charges are made. There are accommodations for 8 officers and 52 men. Dr. Cooper told me that he would always be willing to receive the sick of our Navy on precisely the same terms as those belonging to the English navy. The building, the location, the administration and professional attendance are all that could be desired. It is indeed very fortunate that such an institution is within the reach of our merchant-marine out here and our naval force on the station. The annual death-rate of the hospital is 5 per cent., and among the English naval patients it is only 2½ per cent.

The building formerly known as the American hospital is now leased by Dr. Cooper, and is used as a hospital for contagious diseases, cases of delirium-tremens, and the like, that require isolation.

In the hospitals of Chili I have met with but little of professional interest. I learned that guarana (*Paullinia*) was two years ago a favorite remedy in dysentery, diarrhœa, and sick-headache, but its use has, since that time, declined, and it is little used now. I have little doubt, however, that it is a valuable remedy, and merits a permanent place in our pharmacopœia. It is brought to Valparaiso by Indians from the other side of the Cordilleras, and is sold in the shops at retail for $4 per pound.

In October the people and public journals were deeply interested in discussing the merits of a new remedy for whooping-cough, said to have been accidentally discovered by a child suffering with the disease. It is the leaves of the blue gum or

Eucalyptus globosus, a large tree very common in Chili. There was an epidemic of whooping-cough at the time, and the matter assumed such importance that the intendant of the capital addressed an official inquiry to the protomedico of Chili requesting his opinion as to the merits of the remedy. Up to the day of our departure from Valparaiso the protomedico's reply had not been made public. A medical friend told me he had carefully tried it in one case and its effect was *nil*.

Until one year ago the intendants, or governors of provinces in Chili, and acting under them the police, claimed the right to oblige medical men to visit at any hour sick persons who might request their services. Last winter, acting on this supposed authority, the intendant of Valparaiso detailed every day a physician, taking all of them in turn, foreigners as well as natives, whose duty it was, or rather whose orders were, to attend *gratis* all the indigent sick and any other persons who might send for them or apply to them. The intendant also claimed the right to fix the amount of medical and surgical fees. The medical men, all except two, declined to comply, removed their office-signs, and said they were no longer practicing, and without delay submitted their grievances to Congress. But before the legislative branch of the government had time to consider the matter the executive declared the intendant's course in both matters wrong, and caused his orders to be revoked.

There is no doubt that there are at this time many good opportunities to practice the profession in Chili, and this is especially true in the case of foreigners, who enjoy in general a higher professional standing, even among the natives, than do the medical men of Chili. Till very recently all the natives who were educated for physicians had to be sent to Europe or the United States, and the number of young men who were able to incur the necessary expense attending such an education was

of course very small. Physicians properly qualified are therefore very scarce, and in many large towns, of from 5,000 to 10,000 inhabitants, there is not a single one. The law prohibits any foreigner from practicing medicine and surgery until he has been examined and found qualified by the medical board of Santiago. Candidates are required to speak and read the Spanish language, to pass a thorough verbal examination on professional subjects, to diagnose and prescribe at the bedside, and to write a medical thesis. A degree from any European or American college or university is not, of itself, recognized as sufficient evidence of professional attainments.

The island of Juan Fernandez was visited in the beginning of November, and, as we only remained two days, the information collected is rather meager, and perhaps faulty; for much of it is from the people residing there, rather than from our own observation. Though little of it pertains strictly to a sanitary report, still, on account of the little that is known of the island, its romantic history and the universal interest attached to it seems to warrant me in reporting the following:

We found living on Juan Fernandez six men, five women, and eleven children—all natives of Chili except two. There were 47 horned cattle; 42 horses, mostly wild; 100 donkeys, also wild; a number of wild hogs; 3 wild dogs, recently escaped from a whaler; a dozen or more tame dogs; poultry, and about 7,000 wild goats. The number of goats is believed to be on the increase at present on this island, while on Mas-a-Fuera, owing to the destruction of the young by eagles, they are diminishing every year. The three wild dogs are known to destroy many goats, and the inhabitants are making vigorous efforts to kill them before their number is increased. The residents subsist largely on goat-meat, consuming about twenty goats every week. They shoot them with rifles, or with dogs chase them into the sea. The meat, as we found it in the month

of November, was delicious. Shooting them afforded us capital sport. In the day-time the goats, for protection, often climb into the steep, rocky cliffs bordering the sea, from which, in boats, with our long-range carbines, we could easily kill them, and then they would generally tumble off into the sea. They are of medium size, and generally of a fawn-color, though some are white and others are black. Though their progenitors have been over three hundred years on the island in a perfectly wild state, much hunted by man, their young seem to inherit perfectly the domestic traits of the goat. We had a good opportunity to notice this in two young ones kept on board for some length of time.

The island is a part of the public lands of Chili, and is leased by a gentleman of Valparaiso for a term of years, at the annual rental of $500. His majordomo, resident here, sells wood and provisions to the whalers, and also manages the settlement. This person is also officially recognized, and is called the "administrador." He shows the Chilian flag on the approach of a ship of war, and is authorized to prevent smuggling and maintain order. In 1872 twenty-nine whalers called here, but in the present year, up to the 1st of November, only six have called. There is a good deal of timber. The canelo, a large tree four feet in diameter, the wood of a reddish color, is well suited for the construction of boats and the like, and is also good for fuel. Of the same size and equal value is the luma, a wood which closely resembles white oak. There is still a small quantity of sandal-wood, found only in the remote parts of the island. That we saw was from dead trees, (though still very odorous,) which had probably been killed by fire years before. The peach-tree, introduced by early settlers, seems to have found here a soil and climate so congenial that it has spread all over the island, and is now met with growing wild everywhere. The trees, for the want of trimming, are small, but they were well

filled with half-grown peaches. Plums, figs, and strawberries of a superior kind; many garden-vegetables; wheat, corn, and potatoes grow well when cultivated. There are two sorts of grapes growing at present, both recently introduced. Juan Fernandez, in climate and soil and geological formation, is so like Madeira that it suggests the possibility of its becoming one day, like its Atlantic prototype, a famous wine-producing region. The valleys and many of the hill-sides are covered with a luxuriant growth of grass and wild oats, capable of affording perennial pasture for thousands of cattle. Vegetation here is not dependent alone for water from the annual rain-fall in the rainy season, in June, July, and August; for the elevated peaks, nearly always cloud-capped, condense water from the passing clouds, and it finds its way to the valleys below in the form of many pretty rivulets, broken here and there into cascades. The scenery of Juan Fernandez is very striking. The massive, brown volcanic rocks rise perpendicularly out of the sea, in many places to a height of one thousand feet, and here and there this line is broken by little bays from which deep, green, timbered valleys stretch away into the interior. And then the Yunque, or Anvil, the highest peak, now and then cloud-capped, with its gray, barren, inaccessible summit, gives a wild grandeur to the scenery of the island, which, taken as a whole, cliff and sea, peak and valley, is the most pleasing natural scenery I have ever seen.

Geologically, the island is composed almost entirely of a brown, porous lava—trachyte—from the water's edge to the highest summit. In a few places, lying on the volcanic rock, I noticed concretionary sandstone. The soil is evidently highly ferruginous. There is not a particle of lime on the island, save a very few broken shells which are washed ashore. No earthquakes have been felt for the past eight years.

The climate is a damp one, but certainly not unhealthful, if

the accounts we heard are true. According to our observations the mean daily temperature was 61½° F., the highest being 63° and the lowest 58°; and the average relative humidity was 0.832, saturation being represented by 1,000. There is but little variation in the temperature during the year. Among the 22 residents there was not a single case of illness, nor had there been one for three years. There are no malarial fevers, and coughs and catarrhs are said to disappear quickly after reaching this climate. The robust health of all the inhabitants, children as well as adults, was a noticeable fact.

Excellent fish are abundant, and are easily taken with a hook and line. There is no beach suitable for hauling the seine. We caught a sort of cod, inferior to our own corvincas, a delicious fish, and sheep's-head. Some of the cod weighed 30 pounds each. We also caught a lot of large lobsters, 8 to 10 pounds each, very numerous here, but for food we found them coarse and difficult to digest.

The birds are the eagle, dove, hawk, and two species of humming-birds, and a few sea-birds. There are no wild animals except those already mentioned; and, with the exception of flies and butterflies, insect and reptile life seem to be absent. The earth and vegetation seem to be destitute of creeping things. Perhaps all animal life, even down to the insect tribe, has been brought here through the agency of man.

At the foot of the Anvil Peak, in a valley leading up from Cumberland Bay, on a pyramidoid hill, commanding an extensive sea-view, is a tablet, erected in 1868, by Commodore Powell and the officers of H. M. S. Topaz, in memory of Alexander Selkirk, on the very spot where he is said to have kept his long, lonely lookouts. Selkirk's Cave, now inhabited by wild hogs, is in a pretty valley, running back from English Bay, and is separated from his lookout by a high mountain-ridge. The cave is formed by a ledge of lava, is 10 feet deep, 11 high, and

25 long, and is divided into two natural chambers of unequal size. It is quite dry, and is capable of affording good shelter in this climate. A rude fire-place has been carved in the native rock in the back part of the cave, and the names of visitors have been cut in the rock. The cave is 300 yards from the beach, perhaps 10 feet above the sea-level, and is at present partly inclosed by an old paling-fence.

SANITARY REPORTS.

NORTH PACIFIC SQUADRON.

1873.

NORTH PACIFIC SQUADRON,

1873.

REPORT OF EDWARD EVERS, M. D.,

Assistant Surgeon U. S. Navy.

U. S. S. NARRAGANSETT.

HYGIENE.

During the greater portion of the year the Narragansett has been cruising in the tropics, exposed more or less to the morbific influences always prevailing in that climate. During the last month, however, we have experienced much cooler weather, without any unusual increase of the sick-list; indeed, although we have been subjected to considerable changes of temperature and humidity, the health of the crew has always been satisfactory. We have had an average complement of 135 men, including 14 officers, with a daily average of 3.3 patients, *i. e.*, 2.4 per cent. of the crew have been on the sick-list throughout the year. Only one death, by accident, has occurred during this time, being $\frac{6}{10}$ of 1 per cent. of all the sick.

Ventilation.—The air-space on the berth-deck, the top-gallant forecastle, in the wardroom, and the steerage amounts to about 25,000 cubic feet, and thus allows nearly 200 cubic feet to each man, aside from the open main deck. The ventilation is effected by wind-sails, ventilators, air-ports, and hatches, and is perfectly sufficient for vessels of this size and build, though I have no doubt it would be inadequate in vessels of larger size, with two or three decks. Not a single case of disease occurring on the vessel, while I have been attached to it, could be ascribed to defective ventilation.

Lighting.—In vessels of this size the ordinary arrangement of air-ports, sky-lights, and hatches admits a sufficient quantity of light for all practical purposes, and on board this ship the yeomen and captains of the hold do not present that pale and haggard appearance which these men are always supposed to have on shipboard for want of pure air and sunlight.

Warming.—Wardroom and steerage are heated by steam; the berth-deck by the galley fire, and the tog-gallant forecastle by heated shot. As we have never had occasion to employ warming, I am unable to say whether these means sufficiently answer their purpose or not, or in what respect they may be defective.

Water.—The water used is obtained almost exclusively by condensation, and the supply has generally been very liberal; indeed, as we have been under steam the greater portion of the time, there has never been any scarcity of this beverage. As the product of condensation, it is naturally of as good and wholesome composition as we could wish or expect to find in water obtained from any other source, though, being preserved in large iron tanks, there is always more or less sediment of iron rust. Tanks of glazed-iron, with a layer of powdered charcoal at the bottom, frequently renewed, would probably be an improvement.

Food.—As we have virtually been at sea all the time, at least away from any civilized port, the crew have subsisted principally on ship's stores, though whenever we have been in port fresh provisions have been supplied. When it was impossible to obtain good, fresh vegetables, as was frequently the case, the commanding officer has sometimes given orders to issue an extra ration of fresh meat. Good fruits were abundant in some ports we visited, and the men generally invested liberally in this wholesome article. The preparation of the food has been good, and there has been no cause for complaint.

Clothing.—Of course in this hot climate the white uniform has been worn frequently, though not during the cool weather of the last month. At all times, however, I have endeavored to impress upon the men the necessity of wearing flannel underclothing, a precaution which they persistently neglect, although aware that the hot days are often succeeded by cool and damp nights. The clothing has been of the kind and quality prescribed by regulation, but, in addition to this, each man has provided himself, by order of the commanding officer, with a working-suit of white canvass-duck, which has contributed not only to the comfort but also to the cleanliness of the men, inasmuch as it could be exchanged after the day's work for warm, clean clothing.

CLIMATOLOGY.

The nature of our work has naturally exposed us to considerable changes of temperature, though our time has been mostly spent in a hot climate. Since the receipt of the new "Instructions to Medical Officers," I have kept the meteorological record myself, and transmit the registers of August to December, inclusive, with this report. The monthly averages are as follows:

	Barom.	Therm.	Hygr.	Max. therm.	Minim.
August	24.94	71°.0	68°.0	81°	66°
September	29.94	77 .4	71 .0	87	65
October	29.93	83 .5	75 .7	96	74
November	29.92	75 .4	65 .5	89	61
December	30.01	63 .0	53 .0	76	54

The prevailing direction of the wind has been from the N.W., blowing with greater or less force, but never blowing a gale. We have had rain only on two occasions: at La Paz October 15, and at Loreto, Lower California, November 14; both times, however, in moderate quantity.

In studying the influence of climate upon health, I have en-

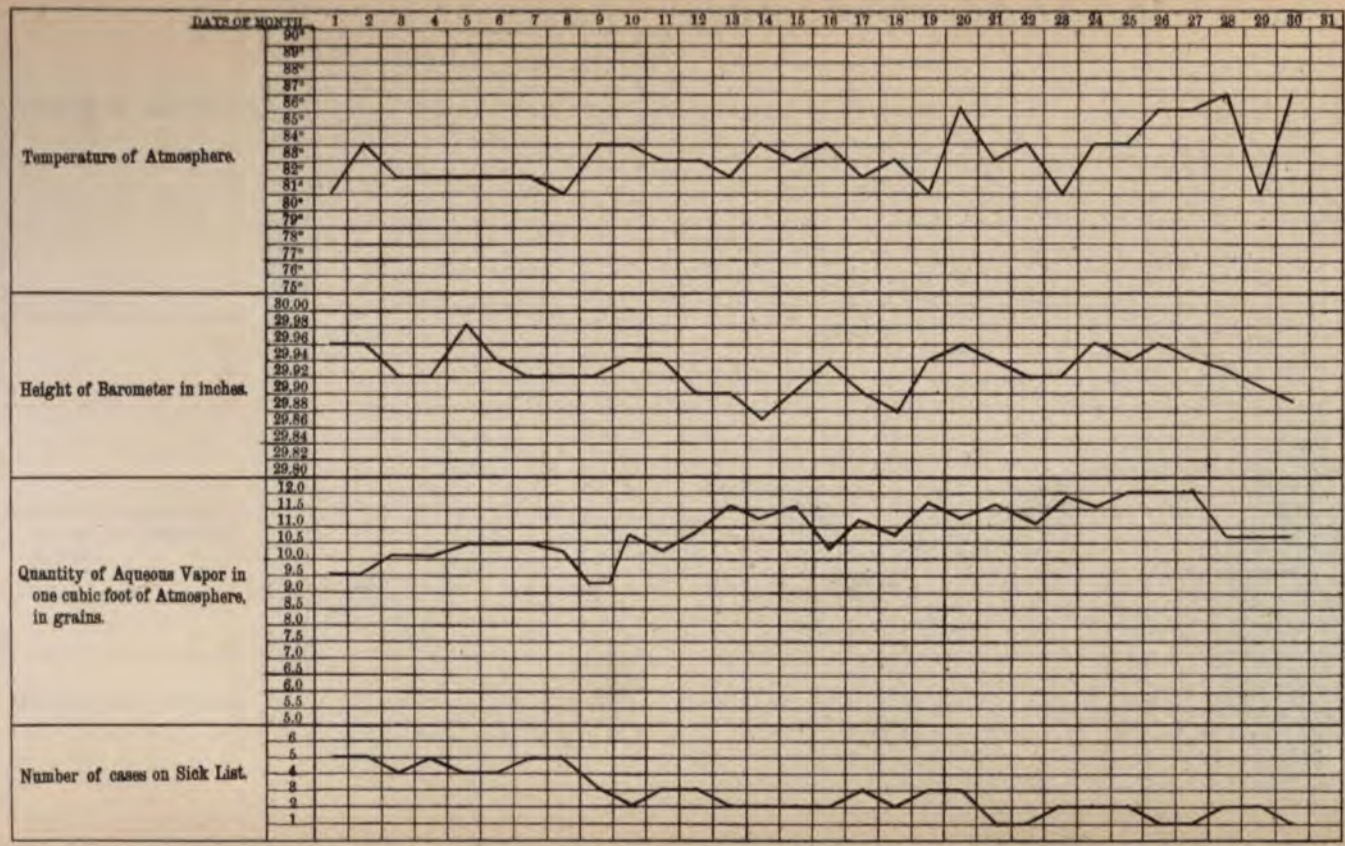
deavored to prepare charts illustrating the relations between atmospheric pressure, temperature, and humidity and disease, copies of which were sent to the Bureau with the different quarterly reports. This seems to me the proper way of investigating the subject, and I think if similar charts were made by every ship of the Navy, sufficient data could be collected in the course of a year or two from which to draw legitimate inferences. Our vessels, too, are the proper places to make such observations, for there a large number of men are subjected, as far as possible, to precisely the same conditions, while each disease can be traced to its cause much more readily than could be done ashore. We shall then probably find that a much greater influence has been ascribed to climate than it really exerts. But while its power over health in general may have been overrated, its influence in the production of special forms of disease may become more apparent. Thus, even the few observations that I have been able to make would seem to indicate that abscesses, felons, inflammations of the subcutaneous cellular tissue, bear a definite relation to the humidity of the atmosphere.

MEDICAL TOPOGRAPHY.

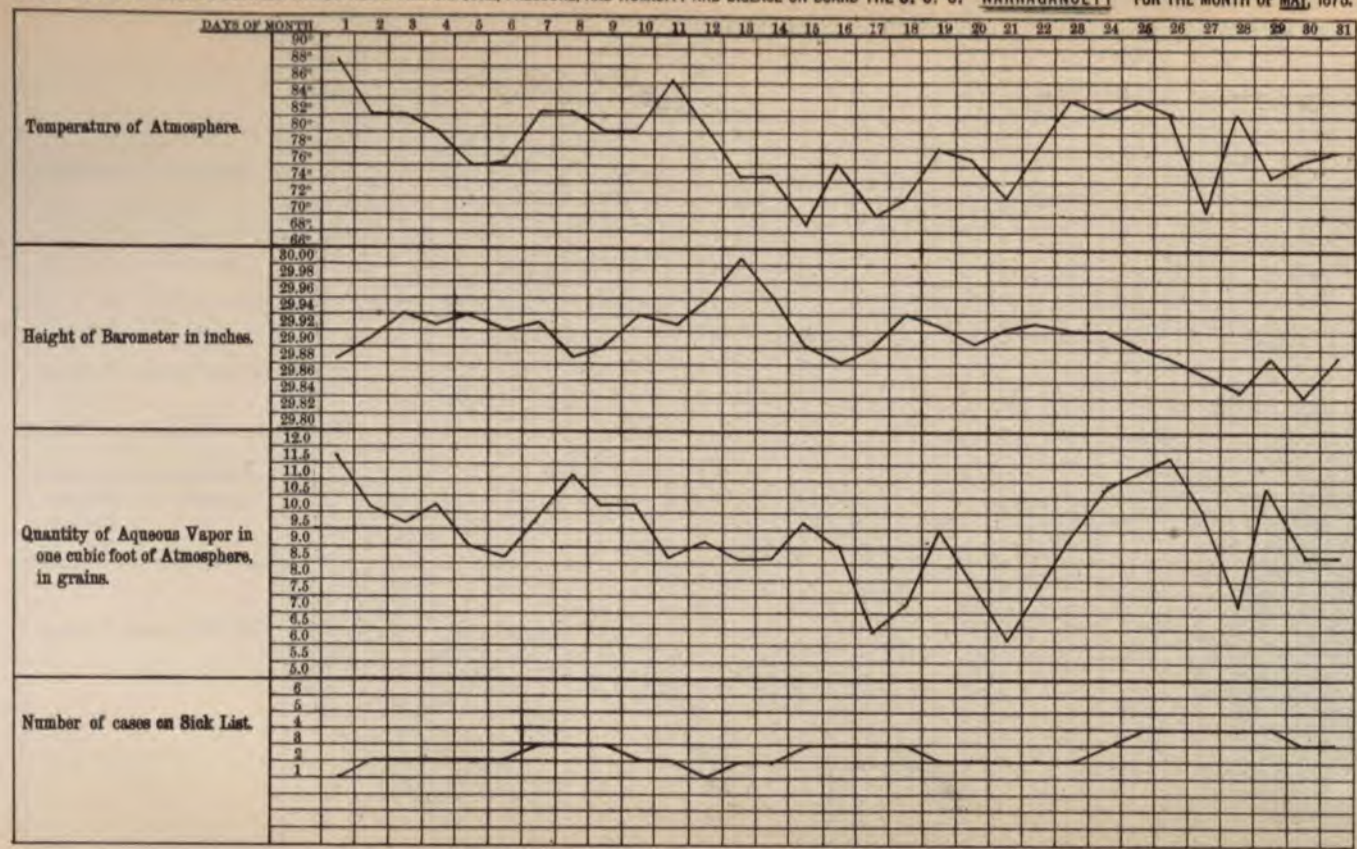
La Paz, Mexico.—Having sailed from Panama on the 16th of April, we arrived at La Paz on the 9th of May last, and, as this little city forms the basis of all our operations, it is the first port in regard to which your Department will require the information I have been able to obtain.

Though formerly a city of considerable wealth, according to the information of some of the older residents, La Paz has been steadily decreasing both in population and prosperity during the last ten or fifteen years, a fact to be ascribed, in a great measure, to the injudicious management of the Mexican government, which has driven the American trade almost entirely from its coast, to the ruin of its own commercial interests.

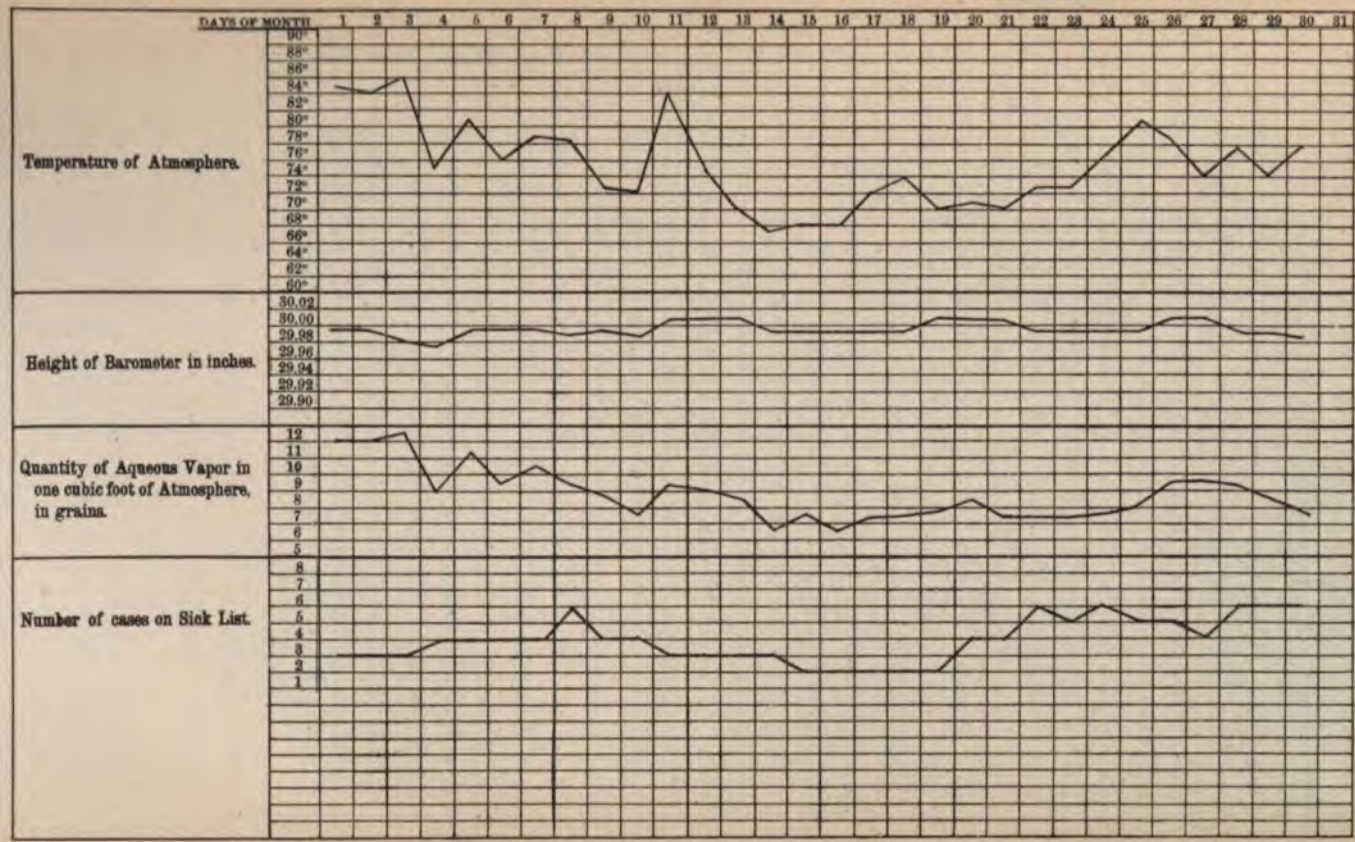
CURVES SHOWING RELATION BETWEEN ATMOSPHERIC TEMPERATURE, PRESSURE, AND HUMIDITY AND DISEASE ON BOARD THE U. S. S. "NARRAGANSETT" FOR THE MONTH OF APRIL, 1873.



CURVES SHOWING RELATION BETWEEN ATMOSPHERIC TEMPERATURE, PRESSURE, AND HUMIDITY AND DISEASE ON BOARD THE U. S. S. "NARRAGANSETT" FOR THE MONTH OF MAY, 1873.



CURVES SHOWING RELATION BETWEEN ATMOSPHERIC TEMPERATURE, PRESSURE, AND HUMIDITY AND DISEASE ON BOARD THE U. S. S. "NARRAGANSETT" FOR THE MONTH OF JUNE, 1873.


DAYS OF MONTH
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Temperature of Atmosphere.
90° 88° 86° 84° 82° 80° 78° 76° 74° 72° 70° 68° 66° 64° 62° 60°
Height of Barometer in inches.
30.02 30.00 29.98 29.96 29.94 29.92 29.90
Quantity of Aqueous Vapor in one cubic foot of Atmosphere, in grains.
12 11 10 9 8 7 6 5
Number of cases on Sick List.
8 7 6 5 4 3 2 1

Situated on a low, sandy coast, a considerable portion of which is formed by deposits from the sea, and surrounded by a scanty and stunted vegetation, La Paz is yet healthier than most tropical ports. The climate, though subject to considerable changes of temperature, is yet bracing and salubrious. During the day the weather is generally very warm, but toward evening a pretty stiff breeze sets in from the southward, and renders the nights pleasant and cool—so much so that we were sometimes obliged to make use of our blankets, although it is in latitude 24° 10′ 7″ north, longitude 110° 22′ 51″ west. We remained at La Paz from the 9th to the 19th of May, inclusive, during which time the highest record of the thermometer was 77° Fahrenheit in the shade, the lowest being 64°, (at night.) The mean noon temperature was 69°.2 Fahrenheit; the barometer standing at 29.92 inches, and the hygrometer indicating 76° and 74° for the dry and wet bulb, respectively.

The meteorological record shows that during our stay at La Paz the atmosphere showed 90° of saturation, yet malarial fevers, to the production of which a warm and moist condition of the atmosphere is necessary, are seldom met with. Eruptive diseases, too, appear proportionally seldom, and children, particularly, seem to enjoy a complete immunity from many of the characteristic diseases to which they are subject in the United States. Thus I have been informed that during a period of six years not a single case of measles has been met with in a population of three thousand, (La Paz proper and its surroundings,) and only one instance of scarlatina, and that not a typical case.

The cholera has never been known to have visited La Paz, but in 1865 there was an epidemic of small-pox, supposed to have been imported by a vessel from Acapulco.

On the other hand, syphilis prevails to an alarming extent. Among the women, ulceration of the os uteri is frequently

met with. It is described as commencing at the os internum and progressing downward, and as being of a persistent and obstinate character. Cancer of the womb, too, is disproportionately frequent, a fact which seems to favor the theory, now gradually gaining ground among medical men, of the ultimate connection between cancer and syphilis. No doubt the persistency and virulence of these ulcerations is greatly promoted by the uncleanly habits of the Mexicans. These are the more unpardonable as fresh water is found at a depth of 3 feet in the seaward half of La Paz, and at a depth of 30 feet toward the mountain side.

As there are no sanitary regulations, and no attempt is made to record deaths, births, and marriages, it is impossible to obtain accurate medical and vital statistics. It is said, however, that there are more deaths among women than among men; the reason assigned being that a woman is thought little of, and receives little care and attention when sick, while a man is well provided for.

It may not be out of place here to mention two very interesting cases that came under my observation at La Paz, though their description is necessarily imperfect and incomplete.

The first was a Mexican, aged about 40 years, a patient of Dr. Hungerford, who asked me to see the case with him. He had enjoyed good health until three months prior to our visit, when he began to complain of pain in the region of the heart, and of sudden fits of dizziness and fainting. These attacks had increased in frequency and violence, and when we saw him he was lying on his bed, apparently in great suffering. He complained of intense pain in the region of the heart, immediately below the sternum and in the left iliac region. Over all three of these regions a distinct, well-marked *bruit de soufflet* could be heard, while the finger, when placed behind the clavicle or pressed upon the other two

parts, felt in each a hard, pulsating tumor. The situations of these tumors corresponded to the arch of the aorta, the bifurcation of the abdominal aorta, and the course of the left external iliac artery. The pulse was irregular and intermitting; the tongue coated white, and the bowels very constipated. There was no fever and no edema of the extremities. Was it a case of triple aneurism?

The second case was that of a little girl, eighteen months old, still nursing; well developed; with dark hair and rather large black eyes; bright and lively in disposition, taking an interest in all that was going on. Three months before I saw her she was seized with what at the time was supposed to be an attack of convulsions. Similar attacks, however, have returned more frequently since, and are described as follows: Whenever the child is annoyed or irritated in any way, whenever she "gets mad" at anything, she begins to cry, becomes very much excited, falls down, and then has convulsive motions of the arms and legs; her face and neck are flushed; her tongue cleaves to the roof of the mouth; her breathing becomes irregular and sighing. This attack passes away in from two to ten minutes. There is no absolute insensibility, no froth at the mouth, no distortion of the features. Her mother was and is yet occasionally attacked in the same way. After considerable hesitation I have set the case down as one of hysteria; and, yet, has hysteria ever been observed in a child of eighteen months before? I have been unable to find a record of any case at that early age. Bedford, even, says positively: "It is an affection neither of early childhood nor of advanced age." (Diseases of Women and Children, page 79.)

In the mountainous districts, back of La Paz, the following plants are found, said to possess medical properties, for specimens of which I am indebted to Mr. Felix R. Mendoza:

Sarsaparilla, stem, 1 to 2 feet high, smooth; bearing long,

acute, oblong-ovate leaves: roots slender and straight; not horizontal; not flowering at present, (July;) grows in rocky places.

Golandrina, a low, trailing vine, sending slender shoots along the ground; delicate, oblong leaves, opposite and with a median vein; calyx one, corolla, four sepals; slightly heart-shaped, with white edges and purple base; pistils and stamens, both numerous; roots straight, the branches shooting from its summit like rays; has a fragrant odor, and grows in rocky places, where there is a moderate supply of water. It is said to be an excellent and reliable antidote for snake-poison, being applied in the form of a poultice, and also taken internally in the form of tea.

Damiana, a low shrub, having a woody stem, small crisped leaves, five-ranked; small dull-purple flowers; used by the natives as a preventive of sterility, a property which, of course, it does not possess; it *does* possess highly tonic properties.

Guatamote, a shrub, 3 to 6 feet high; strong, woody, pituitous stem; branching roots, lanceolate leaves, 4 to 6 inches long; flowers not obtained; pleasant odor. Decoction of its leaves is said to possess medical properties in the treatment of paralysis.

Cardon, a species of cactus, 20 to 30 feet high, with straight, very bristly branches, the bristles arranged in straight lines; flowers yellow, five sepals; long calyx. The juice expressed from the plant, boiled and skimmed, is said to form a balsam possessing good healing properties.

All these are found in the vicinity of La Paz, but San José del Capo, whose medical statistics are precisely the same as those of La Paz, abounds in interesting plants.

Here the *castor bean* grows in abundance, yet its products are rarely gathered.

Stramonium, too, is found in considerable quantities, though its virtues are not appreciated.

Pomera, a bastard indigo-plant, is found in this region, which is used as a substitute for the true indigo-plant found near San Blas. It is gathered into large tanks, bruised, and allowed to rot in fresh water, when a thick, dark-blue mass collects at the top, which soon assumes a firm consistency, and yields an inferior quality of indigo. A specimen of the plant has been obtained.

In the mountains in the rear of San José del Capo a species of acacia is found, the gum of which forms an article of commerce under the name of *goma mesquita*. It has the appearance of an unpurified gum-arabic. Mr. Holmann has kindly furnished me a specimen.

Another tree, called *palo corcho*, yields an inferior quality of cork. Specimen obtained.

Palo chino, which also grows in the mountains, yields a reddish-brown wood, which is said to take a high polish.

The *damiana* grows about San José in profusion, and is used by the natives as a substitute for tea.

Of fruits, the fig, plum, date, guayaba, and zabote are cultivated in the gardens. The last is a delicious fruit, shaped like an apple, which deserves to be transferred to the United States. Seed has been obtained.

Of the animals peculiar to Lower California, only two have been met with thus far, the so-called California lion, (*chimbica*,) and the coyote, a cross between wolf and fox. Furs of both of these animals were presented to me by Mr. Mendoza, but, unfortunately, the head is not attached, making them valueless as specimens. In the vicinity of San José a species of skunk is found, the bite of which is said to produce hydrophobia.

A number of other specimens, from the animal, vegetable, and mineral kingdoms, have been obtained, which, though of little importance in themselves, may be of value in characterizing the natural history of Lower California. A collection of shells is

also being made, a large proportion of which has been presented by Captain Dewey. Their description can be better made when the collection is complete. The same may be said of our mineralogical specimens, which, as yet, are few in number, our researches having been confined to the coast.

No doubt, when we come to survey the Gulf of California proper, we shall meet with many interesting specimens of all kinds.

San Diego, Cal.—This little town, situated a few miles north of the Mexican boundary, on the shores of the Pacific, has already become a favorite resort for consumptives from all parts of the Union, at least during the dry season. Though situated immediately upon the sea-shore and enjoying the bracing sea-air, it is exempt, to a great extent, from the heavy dew-falls common along the coast. The air is dry and the temperature remarkably uniform; its average in 1871 was 78°.25, the maximum being 87°, the minimum 39°—a difference of only 48° between the highest and lowest temperature of the year. Already from one hundred to one hundred and fifty consumptives are found at the Horton House during the dry season, and their number is increasing every year. Even with this large influx of diseased visitors, many of whom are in the last stages of consumption, the death-rate is only 17.28 to every 1,000—a very favorable rate compared to that of other cities. Though but a few years old, and numbering only 4,000 inhabitants, the county is about to build a county hospital; until this can be completed, two private dwellings are used for hospital purposes to accommodate twenty-five to thirty patients annually. The medical men of San Diego show a commendable spirit of activity; they have already formed a medical society, and are also beginning the formation of a medical library. Dr. T. C. Stockton, to whom I am indebted for many an act of personal kindness during our stay, is the secretary of the society. Of the diseases usually pre-

vailing at San Diego itself, the majority pertain to the digestive organs—a fact due in some measure to the impure drinking-water used by the residents. They are, however, very tractable, so that there were but five deaths from intestinal disease in 1871. The natural advantages of San Diego as a resort of consumptives could be greatly enhanced by the citizens themselves. One of the first requisites is a number of cottages, suitable for small families, where those who come here to seek relief from suffering can find more of the conveniences and comforts of home; for a hotel, aside from the inconveniences to which its inmates are subjected, is not the proper place for an invalid, particularly one afflicted with consumption.

Loreto and Mulege.—Next to La Paz, these are the two largest settlements on the coast of Lower California, with a population of 200 and 600 inhabitants, respectively. In neither of these villages are there any physicians or apothecaries; naturally enough the people took advantage of our presence, particularly as no charges were made. Of 21 patients at Mulege, only 4 were men, all of whom had syphilis. Of the 17 women, no less than 15 were suffering with disease of the womb. One of these was a case of inversion, complicated with ulceration of the entire protruding suface; one a case of prolapse, and the remainder cases of ulceration of the neck. Of the other two cases, one was a case of fistula in ano; the other of amaurosis depending on cerebral congestion. All the diseases of the womb were of very long standing, varying from three to nine years. In nearly all cases the disease dated back to "the birth of the last child;" this led me to inquire into the method of delivery which is practiced by the "old women." It was explained as follows: As soon as the woman expects to be confined, two ropes are suspended from the ceiling of the room, and, as soon as the labor-pains set in, the woman kneels down, with the thighs separated as far as possible, grasping one of the ropes with

each hand, and assisting every pain by her own efforts. As soon as manipulation is barely possible the work of the attending "old woman" begins, who, by pulling, jerking, and tearing, endeavors to hasten the delivery. That a child is often born dead, or minus an arm or a leg, does not teach them a more rational proceeding. The patient who had prolapse of the womb had been delivered two weeks before our arrival of twins—one born dead, one with fracture of the left humerus, while she herself suffered from the consequences of this barbarous treatment. By permission from the commanding officer medicines were furnished to all the sick.

Guaymas.—The population of Guaymas has been variously stated at from 6,000 to 10,000. There is no medical society, no library, no permanent hospital, and no official record of deaths, births, or marriages. Whenever there are any public patients, a private dwelling is rented for hospital purposes, and the same is done when there are any sick in the garrison, (250 men.) At the time of our visit there were 8 patients in the civil hospital—2 consumptives, 1 with syphilis, 2 with injuries, and 3 cases of disease of the digestive organs. In the military hospital there were 4 cases, which I did not see; 2 of these the surgeon told me had syphilis, but he could not remember what was the matter with the other two. He was a characteristic specimen of a Mexican surgeon.

REPORT OF JOHN L. NEILSON, M. D.,

Assistant Surgeon, U. S. Navy.

U. S. S. TUSCARORA.

HYGIENE.

During the past year this vessel has been constantly employed on special service, in the performance of which it has passed from 3° to 54° of north latitude. The survey of the Isthmus of Darien, from the Pacific port of Chiri-Chiri, occupied the first quarter of the year, and the soundings for the telegraph portions of the third and fourth quarters. A knowledge of these facts will explain the distribution of sickness and character of diseases recorded in the yearly abstract.

As would be readily anticipated, the degree of sickness has been greatest in those months which found the ship in the extremes of temperature and in the performance of active service. Thus the harsh winds and cold storms of the northern coast, and the humid, enervating atmosphere of the Isthmus account largely for the score of sickness, for no epidemic disease has made the ship its habitat during its present cruise.

Beyond the sick-rate ascribable to climatic influences, the disability is divided between the unavoidable mistakes of recruiting-officers and the venerable *habitués* of the asylum, the latter of whom being yet allowed, through mistaken kindness, to cumber the sick-list of vessels engaged in active, arduous service. The amount of venereal disease has been singularly small.

It will be further seen, by reference to the abstract, that the first quarter records a great excess in the casualty and sick rate of the vessel over that of any other quarter of the year. This was directly due to the exposure of the men to the dangerous surf of the harbor of Chiri-Chiri, and upon land while

engaged in boat duty and in carrying provisions over the mountains.

There was, however, a very small development of the diseases, malarial in origin, which have a particular and intense virulence upon the Isthmus; this, notwithstanding there was the freest communication between the ship and the shore. Large parties were constantly ashore, carrying provisions, cutting wood, washing clothes, and standing to their shoulders for hours in the breakers in the noonday sun, passing wood and water to the boats. A party of seventy men at one time remained two days and nights in the woods, exhausted by heavy burdens and a toilsome march, with little food and unprotected by shelter, yet the sickness among these was only that caused by casualty and exhaustion. This immunity was, doubtless, due to the character of the country and the season of the year.

At Chiri-Chiri the mountainous country makes its nearest approach to the Pacific coast, the Cordilleras rising abruptly from the beach; and this mountain-country, in the dry season, is quite free from the deadly miasms that lurk in the great valley of the Atrato, on the Atlantic slope. The cases of malaria were strictly confined to the parties, about thirty in number, who accompanied the surveyors into the eastern valleys; and of these over one-half suffered from one or more forms of paludal poisoning, notwithstanding they alone, of all the ship's company, were subjected to prophylactic treatment, rations of quinine and whisky being served to them night and morning during their absence from the vessel.

Although the invalidism shown by the record was not unusual, the general tone of health was materially lowered. All suffered from nervous prostration, muscular weakness, and loss of appetite, not from the excessive heat; but, as will be seen by reference to the appended tables, because of the uniformly warm temperature and high degree of atmospheric saturation.

Probably one-fourth of the officers and men were plagued with obstinate diseases of the skin, eczematous, furuncular, and ecthymatous. The record does not show the extent of these troublesome complaints, because men were not disabled from the performance of their duties unless the eruption involved the flexures, the joints, or the tense tissues of the body, pointing to the establishment of an adynamic diathesis, probably caused by the grossly unsuitable food and depressing climatic influences in the case of the men, locally determined by the coarse flannel clothes continually saturated during working-hours by the heavy surf.

Under these conditions the orders transferring the ship to northern duty were very welcome, and the beneficial effect of the change was soon shown in the disappearance of the integumentary diseases and in the greater vigor and willingness of the crew. A number of the invalid crew were transferred to the United States Naval Hospital, New York, by steamer from Aspinwall, while others, who came north in the ship, brought souvenirs of the Isthmus which have since caused their transfer to the United States Naval Hospital, Mare Island.

Exposure, on the other hand, to the opposite climatic conditions caused a temporary increase in the sick-rate during portions of the third and fourth quarters. However, insistance upon the necessity of allowing the hair and beard to grow and upon the avoidance of the objectionable habit of spreading open the collar, "sailor-fashion," together with proper vigilance in regard to the underclothing and recommendations in regard to the purchase of rubber boots and over-alls, generally complied with, did much to lessen the great prevalence of catarrhal and bronchial affections, so painfully evident to the ear of one standing on the berth-deck of this vessel at night, during the early part of the cruise in the northwestern waters.

From the following table the sickness is represented by two

hundred and thirty-seven admissions, and the mortality by three deaths; of the latter, one was from typhoid fever, one from accidental drowning in the Atrato River, and the third died from the intentional self-administration of some irritant poison.

Table showing the classes of disease and the number of admissions and deaths on board the United States steamer Tuscarora for the year 1873, in an average force of 185 men.

Class.	Continued to 1874.	Continued from 1872.	Admitted.	Discharged.	Died.
Miasmatic	.....	.....	22	21	1
Enthetic	.....	.....	16	16	....
Dietetic	.....	.....	8	8	....
Diathetic	.....	.....	12	12	....
Developmental	.....	.....	1	1	....
Nervous	.....	.....	5	5	....
Eye and ear	.....	.....	3	3	....
Circulatory	.....	.....	1	1	....
Respiratory	.....	.....	11	11	....
Digestive	.....	.....	43	43	....
Urino-genital	1	.....	6	5	....
Locomotive	.....	2	3	5	....
Integumental	2	.....	55	53	....
Wounds, injuries, &c	1	1	50	49	1
Suicide	.....	.....	1	.....	1
	4	3	237	233	3

Ventilation.—Berth-deck dimensions: Length, 72 feet; height between decks, 6.83 feet; length of section, 10.29 feet; total area of air-space, 10,285 feet; number of occupants, 110; area per man, 93 cubic feet. Means of ventilation: Eighteen circular side-ports, each 7 inches in diameter, equal to 693 square inches of section-area; four deck-hatches, opening upon the spar-deck, having a combined section-area of 66 square feet. Forecastle dimensions: Length, 44.83 feet; height, 7 feet; length of section, 22.41 feet; total area of air-space, 7,355 cubic feet; number of occupants, 60; area per man, 122 cubic feet. Steerage: Length, 21.5 feet; height, 6.83 feet; length of section, 10.75 feet; total area of air-space, 4,337 cubic feet; number of

occupants, 12; area per man, 361 cubic feet. Means of ventilation, one deck-hatch of 18 square feet; six ports, 7 inches each in diameter, equal to 231 square inches. Wardroom dimensions: Length, 41 feet; height, 6.83 feet; length of section, 10.25 feet; total area of air-space, 5,784 cubic feet; number of occupants, 12; area per man, 482 cubic feet. Means of ventilation, two deck-hatches, with aggregate section-area of 29 square feet; also, 12 side-ports, 7 inches each in diameter, equal to 462 square inches of section area.

Remarks.—In determining the ventilation of a vessel, so many varying conditions have to be taken into consideration that no one particular scheme would represent the direction, velocity, and effect of air-currents for any prolonged period; therefore, the observations which are here recorded are merely approximative generalizations, based upon exact observations made for a period of one month, and supplemented by facts which have come under the notice of the medical officer during a cruise of twenty months.

The following observations were made while the Tuscarora was lying in the streams at Mare Island navy-yard, California, between the dates November 10 and December 8, 1873, during which time there was no steam in the ship, (boilers undergoing repairs,) no wind-sails were shipped, the average temperature was 60°, and the average force of the wind between 8 p. m. and 6 a. m. was 1.2. The velocity and direction of air-currents, in the absence of more exact means, were estimated by observations of the movement of smoke, (Parkes.)

Berth-deck.—During the day the ventilation on this deck is of a fair average. The galley, occupying 93 cubic feet of space, standing directly under the galley-hatch, and in close proximity to the main hatch, heats a column of air of a section-area of 37 square feet, moving with a velocity of from 3 to 4 feet per second, thus causing a discharge of from 400,000 to 500,000

cubic feet per hour, equivalent to an entire change of the air of the deck forty or fifty times in an hour. To supply this draught the 693 square inches of side-ports and of the two forward hatches of an aggregate area of 29 square feet is amply sufficient. Standing under the forward hatches, the forcible impact of the descending colums of air demonstrates the thoroughness of the ventilating power.

The result of this forced ventilation, or the ventilation by abstraction, is to make the air of the berth-deck pure and free from moisture. Two hours after a "field-day" the decks are quite dry, and ordinarily the fumes of cooking are scarcely appreciable. During the day the berthing-space of the forecastle is almost as free to the external air as the spar-deck. At night, however, the conditions are changed. During the time of these observations, the temperature of the external air between 8 p. m. and 6 a. m. averaged 54°, which necessitated a closure of the many openings of the forecastle; to this end a heavy canvas screen was let down over the open extremity, the gun-ports were closed, and the hatches opening upon the top-gallant forecastle were covered with tarpaulins.

When thus closed no possible means of ventilation exists, except downwards into the berth-deck through the forward hatches; but as the temperature of the two sleeping-spaces is the same, occasionally in excess under the forecastle, these hatches, as mediums of ventilation, can be practically excluded from any calculation, especially as they are usually covered with gratings and tarpaulins, and converted into beds for those who have no place to swing, or for the watch on deck, who in port are allowed to seek shelter of the forecastle.

The pollution of this atmosphere, the initial capacity of which is 122 cubic feet per man, is very rapid; for, in addition to the natural deterioration, by individuals and lights, by cutaneous and pulmonary exhalations, we have fecal odors arising from

the four water-closets, and the emanations from green stores stowed in the bath-rooms. No chemical or other exact means of determining the percentage of impurity have been employed, but the appeal to the senses, after midnight, is of the most powerful character.

The closure, as already stated, of the two forward hatches, opening from the berth-deck under the forecastle, cuts off 29 square feet of superficial area of hatch-opening, leaving 37 square feet opening into the external air, in addition to the 693 square inches of area in the sides of the ship. As the galley fires are extinguished at sundown, this artificial force, of such efficacy during the day, is lost at the very time when most needed; but there must still be a column of heated air constantly rising, since the temperature of the internal air is much higher than that of the external.

Practically, under these conditions, the air-ports may be considered apertures of inlet, and the hatches apertures of outlet.

In the absence of more exact means, the formula of Montgolfier is applied in finding, approximately, the discharge per hour, the following quantities being used: Factor of temperature 9°, the difference between the average temperature, for one month, of the berth-deck, 63° and 54°, the average temperature of the external air for the same length of time, observed between 8 p. m. and 6 a. m.; height of column in main hatch, 3.41 feet; height of column in galley-hatch, 5 feet; superficial area of main-hatch, 27 square feet; superficial area of galley-hatch, 10.5 square feet; deduction for friction, $\frac{1}{4}$.

$8\sqrt{\frac{3.41 \times 9}{491}} - \frac{1}{4} = 1.44$ linear feet per second $\times$ 27 square feet $= 38.88$ cubic feet per second $\times$ 3,600 $=$ 139,968 cubic feet per hour from main-hatch.

$8\sqrt{\frac{3 \times 9}{491}} - \frac{1}{4} = 1.8$ linear feet per second $\times$ 10.5 square feet $=$

18.9 cubic feet per second × 3,600 = 68,040 cubic feet per hour from galley-hatch.

Total discharged, 208,008 cubic feet per hour. The initial quantity being 10,285 cubic feet, it is seen that the air of the deck is removed more than twenty times in an hour. The number of occupants being 110, the supply of air per man per hour is nearly 1,900 cubic feet, although the initial supply is extremely low, the renewing supply is not even of a fair average—far from supplying the necessary quantity—as is attested by the odors that assail the nostrils when the deck has been occupied several hours.

It is to be doubted, however, even upon this showing, that a perfect interchange or renewal of the air takes place; for, the apertures of inlet being placed so high, and the velocity of current necessary to effect a discharge of twenty times the initial volume being so great, a proper intermingling does not take place—a case of extreme movement, but imperfect distribution. That the power of gravitation is exerted to keep the lower layers of air stagnant is abundantly proved by the fact that the thermometer placed near the lower deck marked from one-half degree to one degree lower than on a level with the air-ports; a condition of things to be anticipated, in view of the fact that the mass of floating bodies is suspended on or above the center of air-space.

The foregoing statement presents but one of the conditions under which the ship is found, and, probably, one of the most favorable. At sea, the apertures of inlet, the side air-ports, are closed, and in all latitudes where the temperature falls below 60° the forecastle is closed up, as before indicated, thus converting the berth-deck into a well, containing over one hundred men, with less than one hundred cubic feet of initial air-space per man—air which can be removed or diluted only through feeble and conflicting currents, affecting a comparatively limited

space immediately surrounding the main and galley hatches, leaving the lower layers of air, and the portions of deck remote from the hatches, to be changed by the feeble influence of diffusion and induced currents. Still worse is the condition where, in wet and stormy weather, the hatches are hooded. During the present cruise battens have not been used upon these hatches, the ship being a very dry sea-boat. In warm climates the conditions improve; wind-sails carry fresh air to the lower decks; the freest ventilation through the forward hatches and the forecastle is allowed, while most of the lower-deck men find places to swing their hammocks under the boom-covers and other shelters of the spar-deck.

Although no disease has arisen among the crew which can be certainly attributed to defective aeration of their quarters, still it is submitted that an initial air-space of less than one hundred cubic feet, with the imperfect and precarious means of renewal enumerated, is so far below the standard, that it may be considered a dangerous minimum, and an invitation to the development of disease, the non-appearance of which must be ascribed to good luck rather than to good management.

It has been suggested by authorities upon naval hygiene that, if a greater initial air-space cannot be given by the naval architect to the workingmen of the ship, at least the question of ventilation should be placed beyond peradventure, by leading pipes from the berth-deck to the fire-room, and thus utilize a power which is sufficient to drain the entire ship. This object could be accomplished in a degree in ships of this class, which have no fore and aft ventilation, by means of gangways through the engine-room, by riddling the bulk-head between the fire-room and berth-deck with lattices, placing at least one row near the lower deck, so as to make sure of the removal of the heavier strata.

Wardroom and steerage.—It will be seen, by reference to the

tables, that the cubic air-space per man in these apartments is, respectively, 481 cubic feet and 361 cubic feet. The initial quantity is much below the average, but the great number of inlets, and the rapid exchange of air, preserve the atmosphere in a favorable condition both day and night, and under the least favorable influences.

The scheme of ventilation considers the wardroom and steerage as a whole; for the light bulk-head is so fully latticed, besides being pierced by two doors, that the atmosphere of the two divisions communicate in the freest manner. At almost the center of these combined spaces, but opening into the wardroom, is a circular hatch, with an elevation of 3 feet above the deck, having a section-area of 9 square feet. It has been determined by a number of observations that this hatch, as an outlet, drains both wardroom and steerage, the apertures of inlet being the after hatch of the wardroom, of 20 square feet section-area, and the single hatch in the steerage, of 18 square feet section-area, together with eighteen side-ports, of 7 inches each in diameter.

The current from the steerage into the wardroom is so strong as to deflect the flame of a candle to nearly a right angle, while the down-draught through the after hatch of the wardroom is strengthened by being confined and directed by the projecting "break of the poop," and on either side by the offices, and is, finally, deflected down into the wardroom by striking against the bulk-head of the cabin.

During the time of these observations the difference in temperature between the external and internal air was so small, from $1\frac{1}{2}^{\circ}$ to 2°, that the law of Montgolfier was not applied, it being believed that greater accuracy would be obtained, in the absence of an anemometer, by estimating the velocity of escaping smoke, and multiplying this by the sectional area. The average velocity being 2 feet per second, and the hatch having

a superficial area of 9 square feet, the discharge per hour is 64,800 cubic feet. The initial quantity of both apartments being 10,121 cubic feet, it is seen that the air is renewed six times in an hour; and the number of occupants being 24, each one receives 2,426 cubic feet per hour, nearly the normal of Parkes.

This estimate, however, really represents an exceptional condition, the force of the wind being only 1.2; usually the movement of the air is much greater, and the distribution is proportionally rapid.

Engine and fire room.—These departments are, with the exception of the cabin, the best ventilated in the ship, both natural and artificial means combining to cause a thorough and rapid change of air. A large number of hatches and cowled metallic ventilators furnish the first-named means, while the power of extraction, furnished by the heat of the furnaces, is sufficient, if properly applied, to drain the entire ship. A great column of heated air is continually passing upward through the ample hatches, with a velocity of from 3 to 5 feet per second, according to the strength of the fires. But in this vessel, as has been indicated, its effects are limited to the middle sections of the vessel, because there is no constant communication with the berth-deck forward, or the steerage aft. A small door opens from the steerage into the engine-room, but it is seldom kept open. The door in the berth-deck bulk-head has never been opened.

Lighting and warming.—There are no marked defects in the lighting and warming of the ship. In regard to the first-named consideration, there is a sufficient number of hatches, and it is believed they are all as well placed as is consistent with the other vital considerations. The after part of the ward-room, however, is so ill-lighted that lights are kept burning during the entire twenty-four hours. This could be remedied

in some degree, and with very little expense, as has been done upon the Kearsarge, by omitting the side-lockers of the pantry and inserting air-ports, one on each side. The occupants of the three after rooms, on each side, are compelled to use artificial light constantly, because their rooms are furnished with the old-fashioned air-ports, which seem to have been ingeniously contrived to obstruct light. They should be replaced by the hinged port with rubber gasket. The heating of the ship, by steam-coils, is sufficient.

Water.—The ship carries ten days' supply of water, contained in four iron tanks, of a capacity of 900 gallons each. The capacity of the distiller is about 900 gallons per diem. The daily average expenditure is 300 gallons, under the very liberal allowance of 1½ gallons per man. The water supplied to the ship has been of fair average quality, and no case of sickness has been traced to contained impurities.

Early in the cruise the practice of whitewashing the tanks was discontinued, as the water acquired therefrom an unpleasant and acrid taste. During the first three months the distilled water was nauseous from contained traces of fish-oil, that lubricant having been liberally applied to the inner surfaces of the boilers and condenser to preserve them. This fault was partially remedied by passing the water through layers of sand and charcoal. As this vessel has been a great deal at sea, necessarily the supply of water has been largely from distillation; but, whenever it has been possible, water has been obtained from shore, principally because of its greater economy, as the cost of distillation from large boilers is excessive.

The water supplied, under favorable conditions, by the distiller is of good quality, with a scarcely perceptible percentage of salines to the various tests applied. The favorable conditions are, however, so limited that frequently during the cruise the water supplied has been acrid and offensive to the taste, with a

percentage of hardness equal to 15 of the soap-test, and sufficient salines to produce a heavy precipitate with chemical tests.

This arises from the fact that the distiller is supplied from a pipe which taps one of the main boilers, at such a height that so small a motion as 8° of rolling motion carries the water over from the boilers into the condenser. This defect cannot be easily remedied, I am informed by the engineers, because the boilers are now tapped at the highest possible point. It is suggested that the delivery-pipe be carried up at an angle from the point of supply.

In point of economy, as well as hygiene, a small detached boiler, with single furnaces, is needed.

The ship is supplied with Baird's aerator, but it was detached from the distiller early in the cruise because it did not deliver water with sufficient rapidity to meet the demand.

The matter of aeration is considered by some a question of æsthetics in taste, but it is believed, by good authority, that oxygenized and palatable water is more easily digested, so that this defect may be worthy of rectification for sanitary reasons.

The following observations upon the quality of water received from shore during the cruise will illustrate the method of examination, following the recommendations of Parkes and of Taylor's Chemistry. These observations are necessarily crude and imperfect; for more exact observations a well-selected case of standard tests with the burette is needed.

Callao, Peru, December 12, 1872.—Received water from shore, delivered through canvas hose, from an iron water-boat, the water being stowed in bulk in the hold of the lighter. The water was obtained from a reservoir said to be supplied, through earthenware pipes, from the river Rimac.

Physical properties.—Odorless; colorless; without free carbonic acid; neutral; markedly unpleasant to the taste; no

suspended matters; complaint of its hardening vegetables; no ascertained effect upon the men.

Evaporated one gallon to one pint without change of color, formation of pellicle, or deposit. Resultant pint evaporated and incinerated in a Berlin capsule; the solid remainder, of a brownish-white color, weighing $7\frac{1}{2}$ grains. No blackening or marked odor during incineration.

Chemical tests.—For organic matter, using the standard solution, $\frac{1}{3600}$ part of potassium permanganate, (Taylor,) and exposed to light, decoloration did not take place for three hours. For relative hardness, using standard solution of soap, (Taylor,) in comparison with distilled water, fourteen times as hard; hardness not removed by boiling.

For sulphites—Chloride of barium solution produced a turbidity, amounting to a slight precipitate after standing.

For chlorides—Acid nitrate of silver solution produced a turbidity scarcely perceptible.

For calcium salts—Oxalate of ammonium solution produced a slight turbidity and precipitate.

Recapitulation.—The results given by the physical examination are confirmed by the chemical reactions. Thus the contained matters are all mineral and in small amount. The calcium carbonate being practically excluded by the boiling process, the chlorides, scarcely appreciable, are excluded. The precipitates by the tests for lime and sulphates being apparently of relative quantity, the contained mineral matter may be said to be principally calcium sulphate, probably a trace of magnesian sulphate; and this conclusion is further supported by the external hardness of the water with so small a contained quantity of minerals.

In the rainy season, I am informed, the water is markedly purgative, but whether from organic matter, the banks of the river Rimac being used as an abattoir and cloaca for Lima dur-

ing the dry season, or from reaching the numerous magnesian springs in the hills, is not as yet ascertained.

Panama, Colombia, January 4, 1873.—Received water from shore, delivered through hose of canvas, from an iron water-boat, the water being stowed in bulk in the hold of the lighter. The water was obtained from the iron reservoirs of the Pacific Mail Steamship Company, and is the rain-fall of last season.

Physical properties.—Unpleasant odor, disappearing after a short exposure to air; a scarcely perceptible brown tinge; neutral; without free carbonic-acid gas; excellent cooking-water; no observed bad effects upon the crew.

Evaporated one gallon; when about half reduced a slight pellicle began to form; complete evaporation gave a black residue, but the difference in weight, before and after incineration, was not evident by the shop-scales; no ammoniacal odor; weight, 9.5 grains.

Chemical tests.—For organic matter, discoloration in one hour; for relative hardness, seven times as hard as distilled water; for sulphates, slight discoloration; for chlorides, turbidity not marked; for calcium-salts, scarcely perceptible.

Remarks.—A good potable water, containing traces of organic matter, probably vegetable; the minerals, a mere trace; probably introduced in carriage.

Chiri-Chiri, Isthmus of Darien.—The water used here during a period of two months was obtained from a swiftly-running mountain-stream. It is a sparkling, pleasant water of a low degree of hardness, containing mere traces of mineral matters, from 4 to 9 grains, and a scarcely appreciable amount of organic. From the mode of carriage, it occasionally contained a considerable turbidity of chlorides, being loaded into breakers, which were towed through a heavy surf to the ship's side.

Mare Island navy-yard, Cal.—The water is here obtained from the city works of Vallejo, which are supplied from a large

artificial fresh-water pond, the accumulation of the drainage of the hills. It is delivered to the ships by an iron lighter through a canvas hose. It is believed that systematic uncleanliness of the lighter has given to the water it supplies an unpleasant odor, which, however, disappears on exposure. The amount of mineral ash is large, from 15 to 18 grains, and the water is of a relative hardness of 12, making it unpleasant as a lavement and undesirable for cooking purposes.

Food.—The character of the food supplied to the crew has been good; the facilities for preparing it are ample and well arranged. The ration, as specified in the last circular of the Paymaster-General, dated June 1, 1872, "compiled in pursuance of the acts of Congress," is sufficiently varied, and so largely in excess of actual consumption, that the commutation of rations enables the messes to provide themselves, when in port, with a variety of fresh provisions.

The utmost liberality, consistent with the limited space of the ship, has been extended to the messes in allowing them to lay in stores of potatoes, onions, fresh apples, and meal. The observer desires especially to mention the value of the increased ration of coffee. He believes that to it is largely due the immunity of the crew from disease during this cruise. The quality of the butter issued is also worthy of mention, it being so well preserved that the messes of the officers preferred it to that which could be ordinarily obtained from shore in the tropical latitudes.

The usual board of survey is constantly in session to receive and examine into any complaints in regard to provisions. Under this head may be mentioned the fact that the large amount of constipation existing among the men when at sea, arising in great part from the necessarily-large consumption of specially-preserved food, demands that the ration be increased by some article which would obviate this tendency. It is sug-

gested that Indian meal would supply this deficiency. This food is very palatable, nutritious, and of particular value as a slight laxative. Among the carefully-selected stores of the Darien expedition was a quantity of this valuable food, and nothing was more acceptable to the men. Kiln-dried and packed in sealed cans it is quite portable. One who has once eaten wheaten-bread containing a small amount of Indian meal would not care to return to the ordinary form.

Clothing.—The articles supplied, per schedule, are of good texture and durability. No special experiments have been made, but nothing worthy of special record has come to the notice of the observer.

The difficulty of compelling men to supply themselves with sufficient underclothing, and the effect of this negligence upon the sick-rate of the vessel, can scarcely be passed without notice, although frequently referred to by other observers. Many are found unprovided, and still others insist upon purchasing cheap cotton slops.

Inquiries are constantly made upon this point, and the recommendations of the medical officer are enforced. The true remedy is to outfit the men, when shipped, at the expense of the Government; for to comfortably supply himself sinks the ordinary sailor into a slough of debt, thus begetting personal indifference and loss of self-respect. Started squarely with a bag of good clothing, he can have some hope of complying with the demands of vigilant officers and the requirements of health.

Metcorological observations made at Chiri-Chiri, Isthmus of Darien, calculated from Glaisher's factors.

SPAR-DECK.

Date.	Morning, 9 a. m.						Afternoon, 3 p. m.					
	Wet bulb.	Dry bulb.	Dew point.	Relative humidity.	Absolute humidity.	Barometer.	Wet bulb.	Dry bulb.	Dew point.	Relative humidity.	Absolute humidity.	Barometer.
1873.	°	°	°		*Grains.*		°	°	°		*Grains.*	
Feb. 1	80	80	80	100	10.98	30.03	80	82	79	90	10.50	29.92
2	78	79	77	95	9.90	30.05	81	82	80	95	11.08	29.90
3	78	80	76	90	9.88	29.98	81	83	79	90	10.82	29.94
4	78	79	77	95	9.90	29.96	82	85	80	85	10.86	30.03
5	79	81	78	90	10.18	30.01	83	83	83	100	12.03	29.88
6	78	80	76	90	9.88	29.97	81	83	79	90	10.82	30.00
7	78	79	77	95	9.90	29.98	78	80	76	90	9.88	29.98
8	77	78	76	94	9.69	30.01	81	82	80	95	11.08	29.95
9	78	78	78	100	10.31	29.96	84	84	84	100	12.40	30.01
10	79	80	78	95	10.53	29.98	82	83	81	95	12.42	30.03
11	79	81	78	90	10.18	30.00	83	84	82	95	11.78	29.98
12	79	80	78	95	10.53	30.05	83	84	82	95	11.78	29.96
13	78	80	76	90	9.88	29.95	84	86	83	90	11.85	30.00
14	79	80	78	95	10.53	30.06	80	82	78	90	10.47	29.98
15	77	79	76	90	9.57	30.04	81	83	79	90	10.82	29.93
16	78	79	77	95	9.90	30.01	79	84	75	76	9.42	29.89
17	77	79	76	90	9.57	29.96	79	81	78	90	10.18	29.94
18	79	79	79	100	10.64	29.97	78	80	76	90	9.88	29.97
19	80	81	79	95	10.75	29.94	78	79	77	95	9.90	30.03
20	77	78	76	94	9.69	29.96	82	82	82	100	11.67	29.90
21	79	80	78	95	10.53	29.90	79	82	77	85	9.91	29.93
22	78	79	77	95	9.90	30.03	80	82	78	90	10.47	30.03
23	77	78	76	94	9.69	30.08	78	80	76	90	9.88	29.98
24	78	79	77	95	9.90	30.03	81	84	79	85	10.54	29.95
25	78	80	76	90	9.98	30.05	77	81	74	80	9.55	29.97
26	78	79	77	95	9.90	29.98	78	79	77	95	9.90	29.88
27	78	79	77	95	9.90	29.97	78	82	75	80	9.33	29.90
28	78	79	77	95	9.90	29.99	83	85	82	90	11.50	29.96

Meteorological observations made at Chiri-Chiri, &c.—Continued.

BERTH-DECK.

Date.	Morning, 9 a. m.						Afternoon, 3 p. m.					
	Wet bulb.	Dry bulb.	Dew point.	Relative humidity.	Absolute humidity.	Barometer.	Wet bulb.	Dry bulb.	Dew point.	Relative humidity.	Absolute humidity.	Barometer.
1873.	°	°	°		*Grains.*		°	°	°		*Grains.*	
Feb. 1	86	88	84	90	12.58	29.94	89	91	87	90	13.76	29.92
2	85	86	84	95	12.51	30.03	85	88	83	85	11.87	29.90
3	86	87	85	95	12.89	29.93	84	86	83	90	11.85	29.91
4	84	86	83	90	11.85	29.98	86	87	85	95	12.89	29.93
5	86	88	84	90	12.58	30.04	86	89	84	85	12.34	30.00
6	86	88	84	90	12.58	30.04	88	90	87	95	13.68	29.98
7	84	86	83	90	11.85	29.92	85	87	84	90	12.21	29.91
8	82	84	80	90	11.16	29.94	84	86	83	90	11.85	29.93
9	82	85	80	85	10.93	30.02	84	86	83	90	11.85	29.98
10	84	86	83	90	11.85	30.00	87	89	85	90	12.86	29.99
11	83	85	82	90	11.50	29.92	86	88	84	90	12.54	29.92
12	86	88	84	90	12.58	29.98	85	87	84	90	12.21	29.93
13	85	87	84	90	12.21	30.03	85	88	83	85	11.87	29.96
14	84	86	83	90	11.85	30.02	86	87	85	95	12.89	29.95
15	84	86	83	90	11.85	30.02	87	89	85	90	12.86	29.83
16	85	87	84	90	12.21	30.03	85	87	84	90	12.21	29.97
17	88	89	87	95	13.68	30.03	83	86	81	85	11.19	29.97
18	84	86	83	90	11.85	30.01	84	85	83	95	12.14	29.98
19	83	84	82	95	11.78	30.03	83	86	81	85	11.19	29.98
20	82	84	81	90	11.16	30.02	84	87	82	85	11.53	30.00
21	83	85	82	90	11.50	30.04	85	88	83	85	11.87	29.97
22	82	84	81	90	11.16	30.05	84	86	83	90	11.85	29.92
23	83	86	81	85	11.19	30.06	83	87	80	81	10.98	29.90
24	85	88	83	85	11.87	30.05	86	88	84	90	12.84	29.98
25	83	85	82	90	11.50	29.99	87	89	85	90	12.86	29.97
26	82	84	81	90	11.16	29.97	84	88	82	81	11.32	29.95
27	83	84	82	95	11.78	29.98	84	88	82	81	11.32	29.94
28	84	88	82	81	11.32	30.05	87	90	85	85	12.62	29.93

SANITARY REPORTS.

ASIATIC SQUADRON.

1873.

ASIATIC SQUADRON,

1873.

REPORT OF DELAVAN BLOODGOOD, M. D., U. S. N.,

Surgeon of the Fleet.

FLAG-SHIP HARTFORD.

HYGIENE.

Complement of officers and men, 434. Cubic air-space afforded each man, in cabin, 2,880 cubic feet; in wardroom, 371 cubic feet; in steerages, 200 cubic feet; between decks, for the crew, 87 cubic feet. The percentage of sickness has been, 0.042; of mortality, 0.005. Of the deaths, one (on the passage out) was from congestive chills, the other from drowning.

Ventilation.—The ventilation below the gun-deck is exceedingly defective, and has been made decidedly more so by the addition of a spar-deck above the original model, which is not only in itself an obstruction, but, to accommodate the pivot guns, launches, &c., the hatches are fewer and smaller than those on the gun-deck. For example, the first hatch on the spar-deck over a gun-deck hatch into the wardroom is but 3 feet by 7, *and the cabin ladder covers that entire space;* the only other hatch provided for light and air to the wardroom is 3 feet 9.25 inches by 4 feet 4.25 inches, and it is rigged with a permanent sky-light, double-sashed, and hinged to a stout stringpiece; but there is another obstruction and diminution of this air-passage of 2 feet 2 inches by 13 inches, through which a fixed ventilator leads to the orlop. On the passage out, in equatorial regions, it was so oppressive below that, to afford

even slight relief, two circular holes, 13 inches in diameter, were cut through the spar-deck, through which a bifurcated wind-sail is led down by the companion-way from the gun-deck to the wardroom. The wardroom, with but twenty officers and the servants, is, however, immensely better off for air and light than the forward part of the berth-deck, inhabited by clerks, warrant-officers, a good share of the crew, and the sick. In the first part of the cruise the ship was much under steam, and the bilges were very troublesome.

Lighting.—The air-ports are fitted with the old-fashioned cumbersome plug dead-lights, so that in the rooms and offices below it is difficult to read or write without artificial light.

Steam-heaters are plentifully distributed throughout the ship, and answer all their requirements.

Distilled water only is used on board for drinking, except that procurable at Hong-Kong. At Singapore, on the passage out, through some mistake, 6,500 gallons were received from shore without examination by a medical officer; shortly after occurred a marked increase of cases of diseases of the digestive system, and the injurious effects of that mistake were for a long time apparent.

Nothing connected with the ordinary ration or clothing issued is noteworthy which has not already been cited in official publications of the Bureau.

During the first quarter the Hartford was on the passage out from the United States, (left Port Said January 1, arrived at Hong-Kong, China, March 31,) and was sixty-eight of the days at sea and under steam; the other twenty-two were consumed in coaling in five different ports. According to the present system, landsmen are detailed for service in the fire-room, and they almost invariably broke down after a few watches; in this way nearly all on board of that rating became exhausted by the performance of that unaccustomed and arduous duty,

and upon arrival at Hong-Kong the majority of this class were either on the sick-list or under treatment. During the past year the ship has passed about two months at Hong-Kong, a city under strict English colonial rule, with a garrison of British soldiers and a naval station sufficiently complete to meet nearly any emergency of their service in these waters. The management of the medical establishment under the military, naval, and civil services present no novelties or marked excellencies, except that by means of a police-force of over six hundred persons the benefits of the lock-hospital system are fully realized in this colony. Water is obtained from springs high up the mountains, above the limit of vegetation, and is the only water obtainable on the coast, so far as I know, sufficiently free from organic impurities to be used on shipboard with impunity. In Happy Valley—the English and Protestant cemetery—I learned from the mortuary tablets that 648 persons were buried there in nine years from the forty-ninth regiment; and within three years 246 persons from the ninety-fifth regiment; also 108 from H. B. M. ship Winchester's company in her cruise of 1852–'56; 44 from the Sibyl's in 1855–'57, and 46 from the Calcutta's during her cruise of equal length. Monuments are erected over 248 marines of the fleet, 32 engineers, and 13 of the medical staff. Some of these were killed, but much the larger number succumbed to the "Hong-Kong fever," described as of pernicious remittent type, and which, since excavations, gradings, &c., have been completed, is fast disappearing, so that at this day, with its ample supply of pure water, which has "washed away" one of the chief causes of dysentery, Hong-Kong is reputed to be as healthful as any place in the East.

In our next port, Shanghai, about three months were passed—a most uncomfortable season of still heat and moisture, even to those on shore in spacious apartments, but particularly wretched to beings cooped up on shipboard, especially on one so badly

ventilated as this. Pressing public business alone detained the flag-ship in summer-time at this port, up a river some fifty miles from the sea, and with a flat, noisome country extending on every hand. The large supply of water for the community is obtained, by filtration, from the Woosung River, which receives the filthy drainings from miles and miles of paddy-fields, fertilized with the excreta of the dense population. The "Poolung filtered water" is much extolled in the prospectus of the company, and there is considerable negative testimony as to its purity, &c., but I do not deem it prudent to receive it on board for potable purposes. Many families in Shanghai are furnished with condensed water, and very many more use rain-water.

There is a commodious hospital in Shanghai, (also at Hong-Kong,) where our naval patients have occasionally been sent in an emergency, but neither at this nor any other similar establishment have I observed anything which calls for adulatory note.

Our next three months were at Nagasaki, Japan, one of the most convenient, safe, and comfortable ports on the station, quite central, and with a climate, if not the most equable and wholesome, certainly not inferior in either respect to any other. Our naval depot is already removed there, and, in my opinion, it is by far the most desirable available location for our hospital. Near two or three advantageous building-sites pure spring-water is obtainable; however, concerning all this the Bureau is already amply informed.

During the stay at Nagasaki the general health of the ship's company improved wonderfully, syphilis being the only ailment which they contracted there.

From Japan a trip of three months was made up the Yangtsze River to Hankow, some six hundred miles, then a short stay at Shanghai, and the run to this port (Hong-Kong) concludes the year's cruise of the Hartford, with the ship's company generally in good health and spirits.

REPORT OF CHARLES H. WHITE, M. D.,

Surgeon U. S. Navy.

U. S. STORE-SHIP IDAHO.

HYGIENE.

Since the Idaho has been stationed at Yokohama there have been 60 officers and men attached to her. This number includes the prisoners of the fleet that have been serving out sentences of general courts-martial, the marines, and the Chinese servants.

The crew and marines averaged about 32 in number, and were berthed on the spar-deck, under the forecastle. Each man so berthed had 345 cubic feet of air; each steerage-officer had 245 cubic feet of air; each wardroom-officer had 480 cubic feet of air in his sleeping-apartment. The commanding officer had 635 cubic feet of air in his sleeping-apartment.

The prisoners were confined on the berth-deck in separate cells, which were of the capacity of about 243 cubic feet each.

The air-space on the berth-deck was 27,018 cubic feet. A part of this space was used as a sick-bay, and was separated from the remainder of the deck by a canvas screen.

None but the sick, the apothecary, and bay-man berthed on this deck, except during the last four months and a half, for which time the crew of the United States steamer Ashuelot and a part of the crew of the United States steamer Palos have been supplied with quarters here. These two crews together have averaged about 98 men. The daily average number of sick being about 2 for the last four months, we had, therefore, 102 persons quartered here. Each one had 264.8 cubic feet of air-space. Percentage of sickness, .03; of mortality, (for the year,) .01.

Ventilation.—The forecastle, where the men were berthed,

was ventilated by two hatches, each 4 by 6 feet, sixteen dead-lights, and six hawse-holes. During the winter the forecastle was separated from the rest of the spar-deck by a bulk-head, in which there were two doors. These doors were almost constantly open, and gave a free ventilation to this part of the ship, even when the dead-lights were closed. In the summer, the bulk-head was taken away, leaving a space of 138 square feet open for the admission of air.

The berth-deck was ventilated by nine hatches and twelve side dead-lights. The square surface of the hatches aggregated 312 square feet. A large hatch of 43½ square feet was directly over the galley and allowed the steam and smoke to escape at once. The ship being roofed over, the hatches were off constantly, and a wind-sail was kept set forward where the prisoners were confined. Eleven of the prisoners' cells were ventilated by a single dead-light each, with gratings over the doors; three other cells had no dead-lights, but were ventilated by gratings over the doors and gratings in the doors themselves. The cells were thoroughly aired every morning by opening the doors and leading the wind-sail into them. They were whitewashed frequently, and every attention given to keep them sweet and clean. The prisoners have averaged about 7 in number for the last year and a half, and during that time but one case of sickness has occurred among them of such severity as to necessitate a removal of the patient from the cell to the sick-bay.

The steerage was on the spar-deck, and ventilated by eight windows 12 by 18 inches each, and one door of the ordinary size. The wardroom had two doors leading to the berth-deck, a hatch of 32 square feet, and ten side dead-lights.

The cabin was on the spar-deck, and was ventilated by four doors, twelve windows, and two sky-lights. No defects in the ventilation of the ship are noted.

Lighting.—The ship had a roof extending from just abaft the break of the poop to the break of the forecastle. This materially interfered with the sunlight, and kept the lower part of the ship dark and damp. The cabin only had the benefit of the sunlight, the other parts being so poorly lighted that in cloudy weather reading without the aid of artificial light was difficult. Hatches in the roof would have remedied this defect in a measure.

Warming.—In the winter the cabin, wardroom, steerage, forecastle, and sick-bay were heated by stoves, which kept the ship quite dry and comfortable. In the summer as well as in the winter the galley on the berth-deck served, with the assistance of six drying-stoves, to keep this part of the ship dry. The drying-stoves were also used in other parts of the ship when they were required.

Water.—In Yokohama there are three sources from which water has been supplied to vessels of the Navy.

The Fairmount Water Company have a large reservoir in Ata, in the extreme western part of the town, just at the foot of the hills that limit the native city in this direction. The springs from which this water comes are situated about an eighth of a mile beyond the reservoir on the side of the hills just mentioned, and are three in number. The water is led to the reservoir by an aqueduct deeply laid beneath the ground. This aqueduct is laid along the border of a rice-field, but the surface-water from this field in no way contaminates the water from the springs.

The reservoir is made of stone, and is well covered to exclude dust and dirt. From the reservoir the water is led to a neighboring canal through iron pipes, and there discharged into water-boats of from five to ten tons' capacity. By the politeness of Mr. North, of the Yokohama dispensary, I was allowed the use of his laboratory, where I made an analysis of each of

the three kinds of water above referred to. An examination of the Fairmount water gave the following result:

Amount of solid matter to the gallon, 8.82 grains.

In one hundred parts of solid residue we find:

Silica	7.94
Sulphate of lime	10.00
Carbonate of lime	30.63
Carbonate of magnesia	22.46
Chloride of sodium and potassium	25.40
Alumina, oxide of iron, and loss	3.57
	100.00

The supply of this water is unlimited. On board ship both officers and men had all they required for bathing as well as for drinking purposes.

The capacity of the tanks of the Idaho was about 16,000 gallons, but seldom more than 3,000 gallons were taken on board at one time.

Another variety of water was furnished from the Japanese government water-works.

This water is brought by aqueduct from a river some six or eight miles. This water is supplied to the native settlement of Yokohama from large tanks placed at convenient distances apart. It is very clear and pleasant drinking-water, but contains more salts than the Fairmount water, and is much harder.

One gallon contains 10.36 grains of solid residue.

Composition of one hundred parts of solid residue:

Silica	9.75
Alumina and oxide of iron	8.08
Sulphate of lime	8.11
Carbonate of lime	22.97
Carbonate of magnesia	17.54
Chloride of sodium	34.38
Loss	1.17
	100.00

The supply from this source is apparently unlimited.

The third variety of water was furnished by Girard & Co. It is supplied by springs which issue from the side of the bluff in Hamura, at the south side of the city. It comes from three separate springs, and is very clear and cold.

The reservoir is very near the springs, is well built of stone, and closely covered. It is emptied once a week and refilled, so that the supply is always fresh from the springs.

One gallon contains of solid matter 19.67 grains.

One hundred parts of solid residue are composed as follows:

Silica	10.23
Alumina and oxide of iron	0.71
Sulphate of lime	5.34
Carbonate of lime	28.43
Chloride of sodium	26.33
Chlorine of magnesium	7.20
Carbonate of magnesia	16.01
Loss	5.75
	100.00

The permanganate of potassa test for the presence of organic matter was used, and a slight discoloration was noted in each of the waters. The presence of the iron (protoxide) in each specimen examined will account for this discoloration in the absence of all other proof of the presence of organic matter.

From the foregoing analysis it will be seen that the Fairmount water contains the least amount of solid residue, and I believe it to be the best water to be obtained at this port for use on shipboard. It has been received on board of the Idaho for the last year and a half, and in no case has any evil resulted from its use.

A squadron order of Admiral Jenkins says: "Water obtained from shore is a source of sickness on this station, and therefore only in very exceptional cases will any water, other than that distilled on board ships, be used for drinking or cooking purposes."

This order could not be executed on board the United States steamer Idaho, as she had no distilling-apparatus on board. Care was always used in the examination of all water that came to the ship, and the tanks were thoroughly washed out as often as they became empty.

Food.—Fresh meat and vegetables and soft bread have been served out four times, and the regular Navy ration three times a week.

Clothing.—The articles of clothing furnished by the paymaster have given general satisfaction to the men. The underclothing furnished is too heavy for summer-wear in this climate, and might be improved by the furnishing of a lighter material. Many of the men take off their underclothes on the approach of warm weather, and will not wear them unless they are closely watched and inspected. No watching or inspecting can prevent them from taking off these clothes at night and lying down to sleep on the deck.

The frequent cases of diarrhea and dysentery we have in this squadron I believe to be due to this imprudence more than any other.

CLIMATOLOGY.

Monthly maximum, minimum, and average temperature for the year 1873.

Month.	Maximum.	Minimum.	Average.
	°	°	°
January	58	47	53
February	54	36	41
March	62	40	54
April	63	50	57
May	72	55	65
June	72	66	70
July	83	69	77
August	84	77	81
September	80	64	74
October	72	57	67
November	64	50	58
December	65	47	57

Monthly maximum, minimum, and average pressure for the year 1873.

Month.	Maximum.	Minimum.	Average.
	Inches.	*Inches.*	*Inches.*
January	30.20	29.67	29.60
February	30.09	29.66	29.85
March	30.50	29.61	29.97
April	30.27	29.51	30.00
May	30.05	29.64	29.87
June	30.10	29.57	29.73
July	29.99	29.63	29.77
August	30.00	29.53	29.67
September	30.14	28.72	29.70
October	30.16	29.51	29.90
November	29.97	29.72	29.85
December	30.40	29.80	30.12

Direction and force of prevailing winds, number of rainy days in each month, and the longest duration of storms.

Month.	Direction of wind.	Force of wind.	Number of rainy days in the month.	Longest duration of single storms.
1873.				*Days.*
January	North and northwest	2	0	0
February	North and northwest	2	7	4
March	North and northwest	2	9	2
April	South and southwest, variable	2	9	3
May	South and variable	2	5	1
June	North and variable	1	12	4
July	South and variable	1	3	1
August	Southwest	1	2	1
September	North	3	13	4
October	North	1	6	2
November	North	2	0	0
December	North	2	0	0

MEDICAL TOPOGRAPHY.

The town of Yokohama, Japan, is situated in latitude 35° 26′ north and longitude 139° 39′ east, on the shore of the bay of Yedo. It is built partly on low land but a few feet above the level of the sea, and partly on the "bluff." The "bluff" lies to the south of the lower portion of the town, and about 125 feet above it. This lower portion was formerly little else than a marsh, but it has been gradually filled in, and a strong sea-wall has been built, and a canal dug which surrounds and drains the whole settlement.

The permanent foreign population of Yokohama is about 1,000 souls. The floating population, including transient visitors and the sailors belonging to the various ships in the harbor, amounts, on the average, to about 600 more. Until July, 1871, no register of burial was kept at the foreign cemetery here, and there are no means of finding out the rate of mortality in the earlier days of the settlement.

The following is an exhibit of the number of deaths occurring monthly during the last two years and a half among the foreign population:

Month.	1871.	1872.	1873.	Total.	Average rate per month.
January	.....	2	10	12	6.0
February	.....	5	2	7	3.5
March	.....	5	2	7	3.5
April	.....	2	4	6	3.0
May	.....	8	3	11	5.5
June	.....	7	6	13	6.5
July	14	5	6	25	8.3
August	17	14	5	36	12.0
September	6	5	13	24	8.0
October	12	7	5	24	8.0
November	7	3	4	14	4.7
December	6	3	3	12	4.0
Total	62	66	63	191	73.

July, August, September, and October show the greatest mortality. Accident, (drowning, &c.,) phthisis, typhoid fever, disease of the heart, aneurism, and dysentery are the causes of over half the mortality, as will be seen by examination of the record of the "cause of death."

The following table exhibits the ages of the deceased:

Age.	No.
Under 20 years of age	33
Between 20 and 25 years of age	21
Between 25 and 30 years of age	29
Between 30 and 35 years of age	28
Between 35 and 40 years of age	29
Between 40 and 45 years of age	23
Between 45 and 50 years of age	14
Over 50 years of age	6
Ages unknown	8
Total	191

Nationalities of the deceased.

England	95	Switzerland	2
United States	37	Austria	2
France	24	Norway	2
Germany	9	Sweden	1
Italy	6	Denmark	1
Holland	3	Malta	1
Russia	3	Total	191
Portugal	3		
East India	2		

The burial-certificates give the causes of death as follows:

Disease.	No.	Disease.	No.
Febris typhoides	12	Pleuritis	1
Febris intermittens	1	Pneumonia	5
Morbilli	2	Empyema	1
Variola	1	Hæmoptysis	1
Syphilis	1	Pulmonary apoplexy	1
Alcoholismus	1	Colica	1
Delirium tremens	5	Diarrhea, chronic	1
Anæmia	2	Dysentery, acute	7
Rheumatismus acutus	2	Dysentery, chronic	4
Atrophy	1	Enteritis	1
Natural causes	5	Hepatitis	1
Hydrocephalus	1	Peritonitis	3
Apoplexia	3	Abscess of spleen	1
Cerebritis	1	Disease of liver	3
Epilepsia	2	Abscess of liver	3
Convulsions	3	Ulceration of bowels	2
Insolatio	5	Albuminuria	4
Mania	1	Suppression of urine	1
Paralysis	1	Asthma	1
Softening of the brain	4	Ambustio	1
Abscess of brain	1	Concussion of brain	1
Effusion on brain	4	Submersio	15
Tetanus	1	Vulnus incisum	1
Aneurism	6	Fractura	4
Disease of heart	17	Killed by fall	6
Apnœa	1	From unknown cause	8
Asthma	1	Total	191
Bronchitis	5		
Phthisis	23		

The Yokohama General Hospital occupies a healthy situation on the bluff. It is under the charge of Dr. Dalliston, to whom I am indebted for the statistics which follow. All hospital cases which do not fall to the care of the naval and military authorities are sent here.

The following is a *résumé* of the diseases and injuries treated at this institution for the period of fifteen months, beginning January 1, 1872, and ending March 31, 1873:

Cases treated at the Yokohama General Hospital.

Diseases.	Number treated.	Cured.	Died.	Discharged, not cured, and remaining.
Typhoid fever	1	.....	.....	1
Intermittent fever	1	1	.....	.....
Continued fever	1	1	.....	.....
Synocha	5	5	.....	.....
Small-pox	3	2	.....	1
Syphilis	14	11	2	1
Syphilitic ophthalmia	2	2	.....	.....
Syphilitic eczema	1	1	.....	.....
Gonorrhœa	1	.....	.....	1
Dipsomania	3	3	.....	.....
Scurvy	2	2	.....	.....
General debility	7	5	1	1
Rheumatism, chronic	16	16	.....	.....
Rheumatism, neuralgic	2	2	.....	.....
Rheumatism, paralytic	1	1	.....	.....
Brain, softening of	1	.....	1	.....
Brain, effusion on	1	.....	.....	1
Chorea	1	1	.....	.....
Epilepsia	2	2	.....	.....
Mania	6	3	.....	3
Neuralgia	1	1	.....	.....
Paralysis	1	.....	.....	1
Nervous debility	1	1	.....	.....
Disease of the heart	3	.....	.....	3
Aneurism	1	.....	1	.....
Bronchitis, acute	1	1	.....	.....
Bronchitis, chronic	1	1	.....	.....
Phthisis	9	1	4	4
Pleurisy	2	2	.....	.....
Pneumonia	1	1	.....	.....
Colic	1		.....	.....
Diarrhœa	2	2	.....	.....
Dysentery	1	1	.....	.....
Dysentery, chronic	6	5	1	.....
Fistula	3	2	.....	1
Liver, abscess of	2	.....	2	.....
Liver, congestion of	1	1	.....	.....
Bright's disease	6	.....	2	4
Orchitis	1	1	.....	.....
Stricture of urethra	2	2	.....	.....
Cystitis	2	1	.....	1
Uterine ulcerations	1	1	.....	.....
Disease of hip joint	1	.....	.....	1
Abscess	3	2	.....	1
Psoriasis	1	1	.....	.....
Ulcer	2	2	.....	.....
Burn, extensive	1	1	.....	.....
Immersion	1	1	.....	.....
Wounds and contusions	5	4	1	.....
Wounds, gunshot	3	2	.....	1
Injury to leg	1	1	.....	.....
Fracture, Pott's	1	.....	.....	1
Hernia	1	.....	.....	1
Total	140	97	15	28

Nationalities of patients.

England	47	Spain	6
United States	11	Siam	1
Germany	10	Norway	5
France	20	Italy	1
Holland	5	Russia	2
Sweden	3	East India	3
Denmark	6	China	1
Austria	3	Japan	15
Belgium	1		

By an examination of the foregoing report, it will be seen that one-half the patients treated were affected by either syphilis, rheumatism, phthisis, dysentery, Bright's disease, or mechanical injuries. Rheumatism is of very frequent occurrence in this climate, and its cause is traced to the great amount of moisture contained in the atmosphere. Lung-diseases are very common among the natives as well as among foreigners, pulmonary consumption holding the first rank. The victims of syphilis are numerous; and when it is aided by the habitual use of "brandy and soda," as it too frequently is here, it results in the destruction of the sufferers. For obvious reasons, few records of death from such causes ever appear. The credit for the killing is given to heart-disease, or some other old and honorable affection, and the unfortunate dead are thereby shielded and the frequent ignorance that dictates the certificate of burial covered.

The Yokohama native hospital.—The Japanese authorities have established here a hospital for the benefit of their own people. It is under the direction of Dr. D. B. Simmons, a gentleman who has had large experience in the treatment of diseases that affect both the foreign and native population.

A large number of Japanese physicians and medical students attend the morning clinic at this institution, and receive instructions in the theory and practice of medicine.

The western ideas in regard to medicine are enthusiastically adopted by the great majority of the native doctors, and foreign

drugs are largely imported and dispensed at their drug-stores. The spirit of advancement, and the hurry to appropriate the ideas and adopt the manners of the west in the treatment of disease, as well as in other departments of science, lead the Japanese too frequently beyond their knowledge. Until the opening of Japan to the outside world, "Chinese medicine" was practiced throughout the whole empire. Some little knowledge of anatomy had been disseminated by the Jesuits and Dutch; but as the practical study of this department of medicine was impossible, owing to the prejudice of the people, only the most crude notions, derived from old anatomical plates, obtained. Chinese medicine deals in charms, necromancies, and potent drugs. It works by means of strong mental impressions and violent commotions of the physical system; but nursing and the laws of hygiene claim no attention. Such treatment is usually decisive in its effects, and lingering illnesses and bed-ridden invalids are not so common here as among us.

But this practice has become unpopular with the Japanese, and they have thrown it aside with the same apparent willingness that they cast off their two swords. The throwing aside has been easy; but the building up of a proper system among them is a matter of greater difficulty, and one that it will take years to accomplish. In Yokohama, Yedo, and in a few places in the interior, hospitals have been established and placed under the charge of, in most cases, accomplished medical men, whose duty it is to give instruction to the native physicians who wish to avail themselves of the privilege. This instruction must necessarily be of the most superficial character; for the Japanese have not yet advanced far enough to appreciate the necessity of an education preliminary to instruction in the theory and practice of medicine. They jump into the middle of the subject at once, and wallow about in an intellectual mire. With no knowledge of anatomy, they industriously pursue the

study of surgery. With the most indefinite ideas of physiology, they boldly attempt to regulate functions they cannot comprehend; and, to accomplish this, they call to their aid a new, extensive, and complicated materia medica. To make matters still worse, their ignorance of this new materia medica has been taken advantage of by some unscrupulous foreigners, who have stocked the market with spurious, worthless, and often worse than worthless, drugs.

The present generation must go on in the way it has begun, but there is good ground for hope in the future.

Translations into Japanese of the best English, American, and German text-books on medicine are being made, and one great obstacle to the spread of knowledge will be thus overcome. The prejudice against the study of practical anatomy is becoming less; and, if the enthusiastic search of this people after knowledge receives no untimely check, we may confidently expect in a few years to see one or more well-organized institutions established here for the education of young men in all the branches of knowledge now taught in our own medical schools.

To give an idea of the general character of the diseases that affect the natives in this part of the empire, a portion of the yearly report from the Yokohama native hospital is appended. This report was kindly furnished me by Dr. D. B. Simmons.

Cases treated at the Yokohama native hospital during the year 1873.

Diseases.	Male.	Female.	Diseases.	Male.	Female.
Febris continua communis	2	...	Neuralgia	19	4
Febris intermittens	5	2	Curvature of spine, (Ang.)	1	...
Febris remittens	...	1	Spina bifida	...	1
Febris typhoides	1	1	Epilepsia	4	...
Diphtheria	2	...	Paralysis	12	4
Rubeola	2	...	Hypochondriasis	1	...
Syphilis consecutiva	33	5	Convulsions	1	...
Chancrous sores	8	3	Congestion of spinal cord	1	...
Buboes	2	...	Beri-beri, or kakke	36	1
Gonorrhœa	12	1	Hysteria	...	4
Carcinoma	2	3	Conjunctivitis	14	9
Ascites	1	6	Iritis	7	2
Anæmia	9	6	Sclerotitis	2	...
Rheumatismus	6	4	Cornea, ulcer of	5	9
Gangrene, (senile)	1	1	Cornea, opacity of	6	3
Vermes, (lumbricordes)	1	1	Granular lids	4	1
Insanity	4	2	Lachrymal fistula	2	1
Hydrocephalus	3	2	Lachrymal canal, obstruction of	1	...
Meningitis	7	1	Wounds of eye	2	3
Softening of the brain	4	...	Amblyopia	14	3
Nervous debility	3	...	Gastritis	3	1
Keratitis	19	12	Stomach, catarrh of	2	1
Cataract	3	2	Stomach, ulcer of	2	...
Myopia	4	...	Diarrhea	11	...
Surditas	11	3	Enteritis	1	...
Otitis	4	3	Hernia, inguinal	3	...
Caries of teeth	13	6	Liver, cirrhosis of	3	...
Endocarditis	6	1	Liver, congestion of	1	1
Heart, fatty degeneration of	1	...	Tonsilli is	1	...
Phthisis	15	8	Aphthæ	1	...
Pneumonia	20	6	Orchitis	2	...
Hæmoptysis	9	...	Urethræ strictura	7	...
Asthma	7	2	Calculus	1	1
Catarrh, nasal	4	...	Ovarian tumor	...	2
Bronchitis	6	3	Womb, ulceration of	...	1
Emphysema	1	...	Womb, prolapse of	...	1
Pleuritis	6	1	Womb, tumors in	...	2
Hæmorrhois	6	1	Amenorrhea	...	1
Prolapsus ani	1	1	Menorrhagia	...	1
Peritonitis	1	...	Vaginal fistula	...	2
Hepatitis	5	2	Necrosis	2	4
Dyspepsia	31	5	Lymphatics, inflammation of	2	...
Periostitis	5	3	Eczema	10	1
Arthritis	5	6	Lepra	7	1
Adenitis	1	2	Papulæ	9	1
Abscess	10	5	Tumor	1	2
Abscess of breast	...	1	Wounds and injuries	6	1
Cellulitis	1	1			
Glands, disease of	1	...	Total	511	181
Myelitis	1	1			
Total male and female					692

YOKOSKA.

Yokoska is situated twelve miles to the southward of Yokohama, on the shore of a small and almost land-locked bay. The place is only important as the location of a dock-yard. The Idaho, Ashuelot, Monocacy, and Palos were moored here from

July until the middle of November of the past year, the three latter vessels undergoing repairs. A native village occupies the entire breadth of the isthmus that separates Yokoska Bay from Susquehanna Bay, the land on which it is built being but a few feet above the level of the sea. Hills of about 150 feet in height bound the village on its land sides. The site of the dock-yard was formerly occupied by a spur of these hills, which has been dug away and leveled off, so as to make a convenient location for a small navy-yard.

During the stay of the four vessels above mentioned at Yokoska they were moored about 100 feet from this newly-made land, and to this fact I attribute the numerous cases of intermittent fever which appeared on board each of these vessels. Nearly every one who had ever before suffered from malarial poisoning had an attack of this fever while here, and several were attacked for the first time.

About Yokoska there are no marshes; the hills rise almost from the water's edge. The poison which gave rise to this fever, I believe was the product of former decompositions of vegetable matter on the shores of this bay, that it had been confined in the earth for an indefinite period, and was only set free by the recent excavations or levelings that have been made here.

Under circumstances of a similar character, remittent fever of a severe type appeared several years ago among the English troops at Hong-Kong. A large number from one of the regiments stationed there were seized with this fever immediately after the ground on which the barracks were to be built had been dug up and leveled off; no one else suffering from the disease.

Many cases of venereal diseases appeared among the crews of our four ships while here. Like most Japanese towns, Yokoska has a quarter set apart for legalized prostitution; but, unlike Yokohama, the inmates of this quarter here are under no

medical surveillance, but the diseased and the healthy pursue alike their calling.

In Yokohama a lock-hospital has been in operation for the last six years. All the licensed prostitutes are subjected to a medical examination once a week, and those found diseased are confined to the hospital until cured. The benefit of this system is evident to every one who has had the care of the sick on board ships on this station.

Every case of syphilis that occurred on board the Idaho during the last year and a half was contracted, as near as I could discover, from clandestine and vagrant prostitutes that live about the low grog-shops in the foreign settlement.

No good water is to be found in Yokoska for use on board ship. It must all be brought from Yokohama.

VRIES ISLAND.

Oshima, or Vries Island, lies about sixty miles to the southward of Yokohama. This island is about twelve miles in length by six in breadth, and has a population estimated at about four thousand. The shores of the island are precipitous cliffs, and the center is occupied by a volcano 2,500 feet in height, which now and then shows some evidence of activity.

The islanders are primitive in their habits and dress, and live on the simplest diet of fish, sweet-potatoes, and rice.

During a short visit to this place I learned, from an intelligent Japanese physician, resident on the island, a few particulars relating to the diseases here prevalent.

Diseases of the lungs and air-passages are very common, causing 20 per cent. of all the deaths.

Beriberi (called by the natives "kakke") affects a large proportion of the young and middle-aged men.

Rheumatism, arising from the humid state of the atmosphere, and the exposure to which, as fishermen, the greater portion of the males is subjected, is also very common.

Worms (*Lumbricoides*) affect many of the inhabitants, and their production is supposed by the doctor to be favored in some way by the large use of sweet-potatoes for food.

Syphilis and its progeny of scrofulous affections are not uncommon.

A fever (probably typhoid) occurs.

Dyspepsia, in some form, here, as in every other part of Japan, is a very frequent complaint. The large consumption of uncooked fish and vegetables may account for its prevalence, but I believe that the national custom of bathing daily in very hot water tends, by overheating the whole body and strongly determining the blood to the surface, to disturb and weaken the digestive powers.

Diarrhea and dysentery prevail at some seasons. I saw one case of elephantiasis of the scrotum.

Report of W. K. Schofield, M. D.,

Surgeon U. S. Navy.

U. S. S. Lackawanna.

The United States steamer Lackawanna went into commission at Mare Island navy-yard May 8, 1872. The crew was examined physically by myself on the United States receiving-ship Vermont in January, 1872. On the 1st of March, 1872, the crew took passage in the Pacific Mail steamer Ocean Queen, with six of their officers from New York. A few days after sailing they assisted in getting the ship from a reef upon which she struck *en route* to Aspinwall. More than one man, after that event, attributed to the exposure on this occasion the cause of fugitive rheumatic pain.

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The officers and crew remained on board the Lackawanna at Mare Island for two months before proceeding to sea. These months were May and June. The atmosphere was clear; the dry season had recently set in, and cool breezes prevailed. While in California we laid in a supply of electricity with which the atmosphere was charged. This dry air and electrical induction served to increase the ruddiness of complexion, as well as increase the weight quite markedly in most of those who were strangers to California.

We left California June 23d and immediately proceeded to the tropics in order to catch the trade-winds which took us to the coast of Japan.

No stop was made at Honolulu, which, on the tenth day out, we passed within forty miles.

This was afterwards regretted on account of the partial failure of the supply of fresh fruits, meats, and vegetables stored for the voyage of fifty-six days' duration. This deprivation had no other ill effect than to produce a few cases of constipation. A supply of lime-juice was distributed weekly to all the messes through the medical department.

This supply was not actually required as a medicine, although as a stomachic it was highly appreciated during the hot weather of July and August in the tropics. Two hundred and fifty men and officers were on board. The air-space, which averaged 200 cubic feet per man in California, was increased indefinitely after proceeding to sea, and continued after reaching Japan. Two hundred persons slept on deck on the forecastle and on the poop under the awnings in fair weather. In case of rain, by half of the men proceeding below on the berth-deck, the air-space was reduced considerably; generally, the air-space to the few who slept below in the sick-bay and berth-deck was 1,500 cubical feet to each.

The percentage of sickness during the summer and fall was

5; the mortality was *nil.* This is owing to the salubrity of the climate of Japan during the months of August, September, and October, the time of our residence at Yokohama. In November we ran rapidly down from a latitude of 40° to 1° north of the equator, stopping *en route* at Nagasaki, Shanghai, and Hong-Kong, changing climate without difficulty.

The weather became hot, perspiration was active, clothing was changed from blue cloth material to the thinnest of white linen and cotton.

The surgeon of the Dwarf, stationed at Singapore for six months past, informed me that no active disease prevailed; the men were simply languid from the effects of continued heat.

The maximum temperature during our stay near the equator in December and January was 98° Fahrenheit; the minimum, 80°; the average, 88°; average pressure, 29.90; relative humidity, 70 to 80 per cent.

We found on our arrival at Calcutta, latitude 22° north, longitude 166° east, that our visit was timed at the best season of the year, namely, December. We found the weather agreeable. The average daily temperature during our stay was, at sunrise, 60°; at 1 p. m., 65°; at 3 p. m., 75°; at 9 p. m., 60°.

The direction of the prevailing wind was northeast; there was no rain. Our anchorage was opposite Fort William, the old Maidan, of 600 acres, reserved as a park and parade grounds. Our position was as good a one, apparently, as could be obtained.

Calcutta has become the healthiest city in India since the perfection of the water-supply.

I visited Pultah, thirty miles from Calcutta, the source of the water-supply for the city, and had an opportunity to inspect its water-works. When one visits Pultah and sees the thick, brown stuff that is pumped out of the Hoogly River and com-

pares it with the exceedingly pure water which is distributed in Calcutta, one cannot but admire the skill which has been employed to overcome such a difficult work as that of purifying such water. The water is allowed to settle in the settling-tanks, ten in number, for twenty-four hours before it is suffered to enter the filters, and then only the upper two feet are drawn off.

These settling-tanks rid the water of one-half of the sedimentous matters. If the river-water had been carried direct to the filter-beds they would have become choked within a day or two after being set at work. The settling-tanks, after being used two months, have their floors covered with a thick layer of mud highly charged with putrescent organic matter. Above this layer of mud rests a layer of water which is constantly maintained in a very foul state by the fall of sedimentous matter of the upper stratum. The water pumped up from the bottom stratum gives an extremely offensive odor, while the water upon the surface of the tanks continues good. The cleaning process pursued in the filtering-tanks consists in removing two inches of the dirty surface-sand. The average depth of sand in the filtering-beds is nine inches. The water, after passing through the filters, is improved by its passage through thirty miles of iron piping to the hydrants of Calcutta.

The water from the hydrants has been found to contain only one-half as much organic matter as when it left the filtering-beds at Pultah. This is supposed to be due to the surface-action of the iron, which would bring about oxidation of the ammonia of the water to nitrous acid, which, in its turn, would oxidize and destroy the organic matter. The water to be operated upon at the Pultah water-works, for most of the year, is such as in no other part of the world is required to be prepared for consumption.

Dr. McNamara states that so long as the water supplied

by the Calcutta hydrants remained pure, the death-rate from cholera was low, but immediately the water supplied by the Calcutta municipal works became impure, that is to say, from the end of September to the end of the year, the death-rate ran up to a figure corresponding to what it used to be when many of the inhabitants used badly-filtered river and tank water.

The truth appears to be that, from the middle of September, 1872, up to the summer of 1873, the drinking-water contained a dangerous amount of organic matter, which found its way into the water after the stream had passed through the Pultah filtering-works. The water at the Calcutta hydrant was examined daily by Dr. Palmer, in April, May, June, and July. The average amount of chlorine found in the water was seven parts in a million, and the organic matter six one-hundredths part. In July, when the Hoogly River water is considered muddy, the total amount of solid matter is 1,076 parts in a million, and in filtered water 176 parts in a million. The water at the Calcutta hydrants is, by distillation with potash and permanganate of potash, made to yield the nitrogen of the organic matter in the form of ammonia, and then measured by the delicate test called Nessler's.

During my stay in India I traversed nearly the whole breadth of the so-called periodical endemic district of cholera. This area of 20,000 square miles in December and January was quite dry, and free from those downpours of rain followed by intensely hot weather—two things which Dr. McNamara says are necessary in order to have an epidemic of cholera in India. There is, of course, in this plain prolonged heat and decomposing organic matters to act on the more or less debilitated Europeans. In this plain we have much dust attendant upon a hot and dry season. This has, by some writers, been called cholera-dust, from the idea that the seeds of the disease are thus carried about.

The endemic area extends along the Gangetic Basin eastward to the Himalaya Mountains, westward to the Deccan, northward above Delhi, and southward to Calcutta.

The soil is alluvial over most of the area, and consists of a bed of yellow clay, as in the region in which Patna and Benares are situated.

The cholera here comes into existence among the hot, moist vapors of the wet, flat ground that borders upon the Ganges and Jumna, the so-called breeding-grounds of the cholera. Epidemic cholera has taken two well-defined routes on its invasion of Europe: one starting from the basin of the Ganges, near Benares, and the other from the region about Cawnpore, at the river Jumna; thence to Agra, to Delhi, across the northwestern provinces into the Punjaub; thence across Beloochistan and northern part of Persia, above the deserts, to Russia and Turkey.

On December 23, two days after our arrival at Calcutta, John Cunningham, landsman, age 31, was taken sick with cholera, without apparent cause, and died the same day. This was believed to be a case of sporadic cholera. There was no premonitory diarrhea; the patient was not known to have made any errors of diet. The ship remained healthy until the 29th December, six days, when J. C. Cross, paymaster's writer, was admitted with cholera. Cross had been on liberty with others, and had also been at the same time on a heavy debauch on shore, was reduced in health; moreover, he had been under treatment several days for alcoholism. He died on the 31st. Benjamin Carthew, ordinary seaman, extra, aged 23, admitted with cholera December 31; discharged to duty January 5. Conrad Aushick, landsman, aged 19, admitted January 1, and discharged to duty January 8. John Stanton, marine, age 21, admitted January 1, and discharged to duty January 10. John Reid, chief boatswain's mate, admitted January 2; died January 9. Martyn

Byrne, master-at-arms, admitted January 3; died January 4. John Wilson, captain's cook, colored, age 21, admitted January 3, and discharged to duty January 5.

The total number of cases admitted was eight, of which four died. There were at the same time nine cases of diarrhea admitted, of which all recovered.

The Lackawanna remained in Calcutta thirteen days. On the 3d of January she went to sea, in consequence of the presence of Asiatic cholera on board. No new cases occurred on the ship subsequent to this event.

En route to Hong-Kong the Lackawana made short visits at Penang, Singapore, Bangkok, Saigon, and Manila—all situated within the tropics. Two weeks were spent at Bangkok and two weeks at Manila. The latter port is one of the favorite ports of the east. The climate is salubrious. Hong-Kong was reached in March, and a stay of a month was made. The mean annual temperature of Hong-Kong is 73° Fahrenheit; hottest month, (July,) 86°; coldest month, (January,) 52°. The humidity amounts to ten grains in a cubic foot of air in July and four in January. The northeast monsoon blows from May to October, and is considered enervating and relaxing. The difference of thermometer between the two monsoons is as much as 46° Fahrenheit.

Use has been occasionally made by our fleet of the English new naval hospital at Hong-Kong. The naval hospital was formerly the residence of the merchant-princes Jardine, Mathewson & Co. The edifice has been changed somewhat, and appears to answer admirably the purposes of a hospital. It is in the eastern and salubrious suburb of Victoria. It was purchased by the admiralty at a cost of $35,000. The hospital consists of four oblong buildings, with their inner angles approaching but not touching each other, forming an inner oblong square. It has broad varandas on all sides, protecting the inmates of the

wards from the sun's rays, and affording ample space for exercise in all kinds of weather. The wards are lofty, well lighted with gas, and there is an ample supply of pure water. The admiralty has done wisely in securing so pleasant and comfortable a retreat for the officers and men of the fleet who may happen to be sick or wounded. The hospital now contains about thirty patients, and is under the management of Deputy Inspector Loney, royal navy.

After a month's stay in the vicinity of Hong-Kong, we returned to Japan, arriving at Yokohama on the 20th of April. The air felt to us cool and bracing, Fahrenheit 68°, and continued so during our stay in Japan, at the ports of Yokohama, Hiogo, and Nagasaki, during the months of May and June.

We reached Shanghai, China, on the 14th of June, and remained there until July 20. Found the weather hot and close, thermometer standing at 85°, with but little difference in the range during the night. The water used came from the ship's condenser at first, and afterward, when repairs were going on, from the works of the Shanghai Water-Filtering Company. The analysis of the filtered water proves it to be exceptionally pure, free from organic impurity, and there being no water-closet contamination flowing into the Woosung River renders the filtered water of the river harmless as a beverage.

A residence in Shanghai tends to convince one that the injurious effects of brandy and the various compounds, known as cocktails, on the livers and stomachs of the community, are not sufficiently considered in arriving at a conclusion respecting the health of foreigners in Shanghai.

Our stay at Shanghai was attended with the following cases of diarrhea: Ten cases of acute diarrhea were admitted upon the sick-list, and some twenty additional cases were prescribed for; four cases were attacked the second time and three the third time. Our stay was thirty-six days; too short to induce

chronic diarrhea, with the exception of perhaps four or five cases. After proceeding to sea diarrhea ceased. Our next visit was to Cheefoo, in the north of China, a summer-resort for the Europeans of Shanghai, in the latitude of 37° 30′ north. A short stay was made at Cheefoo; thence we proceeded to the Peiho River, 39° 45′ north; thence to Ninghia, Great Wall, 40° 42°; thence on return trip to Nagasaki, where we arrived August 3. Here a stay of fourteen days was made, and then we sailed for the port of Vladivostock, Eastern Siberia. Vladivostock contains five hundred inhabitants, Tartars and Russians. This place has a climate more nearly like our own than any other in the east, and will no doubt prove a favorite resort for ships on the Asiatic station in the months of July, August, and September. To this place will come the party in December, 1874, from the United States, in order to observe the transit of Venus. The average temperature during the summer in this part of Eastern Siberia is 72°. The winters are cold, the thermometer usually standing at zero and below. The cold is continuous and the air dry. The native Tartar population, as well as the few Russians, are large, muscular, and present an extremely robust appearance. From Eastern Siberia we proceeded directly to Hakodadi, Japan, distant 420 miles, and situated in longitude 140° east, latitude 42° north. There was a marked change exhibited in the humidity of the atmosphere. The heat of the weather was much more perceptible to us, because the moisture in the atmosphere interfered with the sensible perspiration.

At this stage of the cruise the quarters of the warrant-officers were torn away from the berth-deck and the space was given to the crew. This slightly increased the cubical feet of air-space on the berth-deck.

At Hakodadi I met Dr. Eldredge, a gentleman who has charge of the general hospital, also the medical school. Dr.

Eldredge came to Japan two years ago, with General Capron's agricultural mission, in the capacity of naturalist. While in Hakodadi, he received from Prince Kuroda an appointment to the superintendency of medical affairs in Hakodadi.

The general hospital consists of five frame buildings, of two stories each, situated upon a plateau upon the mountain-side.

The patients were seventy in number, with accommodations for two hundred. I saw no case of active inflammation, nor any acute disease.

The diet of rice and vegetables, pickled and fresh, seems to preclude the approach of high inflammatory action.

Dr. Eldredge's medical school has some sixty Japanese students, of ages ranging from 22 to 35. The doctor is the only foreign teacher; he is assisted by six native physicians. During the absence of the doctor, and by his request, I gave several lectures to these students. This was done by the aid of an interpreter, by the use of the blackboard, the skeleton, and medical plates.

I took for one subject fracture of the clavicle; for another, syphilis; for another, disease of the small intestines and diseases of the skin. It is difficult to obtain cadavers for the anatomical-room, owing to the fact that benevolent societies exist in Japan for the purpose of giving cremation, under the superintendence of the *bonzes*, (priests,) to all paupers. The medicines used here are abundant, and are purchased mostly from London druggists.

The surgical instruments come from the same place, and are the most modern. Of these the Japanese produce excellent imitations at Yedo.

The Japanese are not altogether ignorant in regard to the developments in the West as regards medicine. I met one who had received instruction from the Dutch physician at Nagasaki twenty years ago. The Dutch, ten in number, the most per-

mitted to remain on the island Deceima at one time, have, in spite of their surroundings, imparted much medical and scientific knowledge to the Japanese during the last two hundred years. I have many times witnessed the treatment pursued by native physicians. The most common is that of acupuncture. Friction applied to the muscles of the body is practiced in all diseases. Setons and the actual cautery are in constant use. Scars numbering from fifty to one hundred are frequently seen along the spine of a *bettoe*, the result of the application of setons, moxas, and the actual cautery. The Japanese have in their drug-stores a great variety of the leaves, seeds, barks, and roots of medicinal plants indigenous to the soil. These are kept in bales, dried, and only chopped or powdered when required for use. Indigenous rhubarb, gentian, and ginseng are cut into thin laminæ, and used in the form of a tea.

In general the Japanese enjoy good health, and when ill lie covered on their mats, and stop working and eating; giving time for nature to work its own cure. They are probably favored with longevity more than other people owing to the salubrity of the climate. The Japanese are a clean people, wash often, wear little clothing, live in houses open to the air, and look on wide and well-ventilated streets, where nothing offensive is allowed to rest. We reached Yokohama for the third time on October 4, having met our first experience of bad weather during the cruise the day previous. The gale was from the southwest. During our stay I made a visit to the hospital and medical school at Yedo. The medical education of the Japanese at the capital fell entirely into the hands of the Germans. It failed the Americans by the matter of a thousand dollars or so. The American M. D. to whom it was offered refused to take charge under $12,000 a year, the Japanese authorities offering $10,000. The Germans are willing to serve for small sums, say a hundred or so a month, and they make the best of plodders

in the work of instructing in medical as in other sciences. I had the pleasure of meeting Professors Hoffman and Miller. Their medical school and hospital are situated in the central parts of a city of a million inhabitants, about midway between the temple of Sheba and that of Ahsakssa. The buildings are those which were formally occupied as a damio's residence of the first class, and in this temperate climate seems well adapted for a hospital. This, like many other damios' residences and Buddhist temples, has been converted into a serviceable public institution. The buildings, ten in number, are arranged in such a manner as to answer well the purposes for which they are used.

There is a sufficient supply of air; the thin paper doors are on sliding supports, which allow complete exposure of the rooms to the open air and sunlight. The patients number 150, and may be said to enjoy an unlimited air-space.

The diseases are principally chronic, rheumatism being most common. The number of medical students is sixty, many of them quite well advanced. The lectures are given daily, by five foreign medical men, some in the German language and some in the English. Lectures were being given on osteology and materia medica. There it a difference of opinion in regard to the medical education of the Japanese among the foreigners who are instructing at the schools of medicine in Yedo, Hakodadi, and Nagasaki.

Some maintain that, as the contract with the Japanese government lasts for but one or two years, an effort should be made to show the students the extent of ground to be traveled over by touching superficially the various topics of medicine Others maintain that the little instruction the limited time al lows should be thorough. Dr. Greiss, of the Nagasaki medical school, informed me that he should treat each subject thoroughly, although he well knew there would not be time to at-

tend to a tenth part. He would not have the Japanese get the impression that an insight into the science of medicine could be obtained in a very limited space of time. He considers that the contrary view has wrought great harm in the minds of the Japanese.

Dr. Griess was busy for many days on the subject of alcohalometry during my stay at Nagasaki. This medical school and hospital is under charge of Dutch physicians by contract with the government. The course of chemistry, as taught by Dr. Greiss, is particularly thorough and complete.

His laboratory shows liberal expenditures on the part of the government. The lectures by Drs. Greiss and Von Leeven are given in Dutch. An interpreter stands near to translate into Japanese the sentences as they fall from the speaker, for the benefit of seventy students present. Many of the students, however, understand the Dutch language quite well.

Our arrival at Nagasaki for the third time was made on November 1, and at this point we remained at the close of the year 1873.

The equableness of the climate is remarkable, the temperature seldom falling below 32° Fahrenheit in winter or rising above 85° in summer.

This place has been recently chosen for our future naval headquarters, and it seems a very suitable one.

There were but four days in the winter of 1872–'73 when the thermometer fell as low as 31°; and during the summer of 1873 the highest point reached was 93°.

The meteorological register for November, 1873, at Nagasaki is as follows:

Meteorological register.

[United States steamer Lackawanna. Latitude 32° 20′ north. longitude 130° east. Altitude of barometer, 70 feet above sea.]

Date.	Barometer, average.	Thermometer, average.	Hygrometer, difference wet and dry bulb.	Sky, covered.	Wind.	Clouds.	Rain.
1873.							
November 1	30.05	46	3	1-4	N. W.	Nimbus	.....
2	30.30	53	2.5	.....	S. E.	Clear	.....
3	30.15	52	2.5	9-10	S. E.	Nimbus	.11
4	30.16	52	2.5	9-10	W.	Cirro-stratus	.21
5	30.17	52	2	1-4	W.	Cirrus	.....
6	30.18	63	3	.....	N.	Clear	.....
7	30.14	60	3	.....	N.	Clear	.....
8	30.22	53	2	.....	N. E.	Clear	.....
9	30.18	55	4	.....	W.	Clear	.....
10	30.16	50	3	.....	W.	Clear	.....
11	30.20	60	3	3-4	W.	Cirrus	.....
12	30.17	61	3	.....	N.	Clear	.....
13	30.20	57	3	1-16	N.	Cirrus	.....
14	30.20	53	5	1-16	0	Cirrus	.....
15	30.20	58	1	3-4	N. W.	Cirrus	.....
16	30.28	54	3	.....	N.	Clear	.....
17	30.32	53	3	1-2	N.	Cirrus	.....
18	30.36	54	2	3-4	E.	Cirro-stratus	.....
19	30.08	62	2	1-8	E.	Nimbus	.06
20	30.17	53	3	1-4	N.	Cirrus	.35
21	30.05	58	3	1-16	W. N. W.	Cirrus	.15
22	30.21	57	3	7-8	N. W.	Cirrus	.005
23	30.20	56	2	1-8	E.	Cirrus	.....
24	29.90	63	1	1-2	S. W.	Cirrus	.47
25	30.20	51	3.5	1-2	W. N. W.	Cirro-cumulus	.....
26	30.16	62	2.5	1-4	E.	Cirrus	.....
27	30.16	61	2	.....	N. E.	Clear	.....
28	30.05	65	2	1-4	E.	Nimbus	.04
29	29.93	60	2.5	1-4	E.	Nimbus	.47
30	30.01	50	1	1-4	E.	Nimbus	.04
Daily mean	30.15	56	2.5	.....	.....	.....	.063

At Nagasaki, twenty years ago, the first public dissection was performed on the cadaver of an executed assassin, in the presence of forty-five native physicians, by Dr. Van Meerdevort. This made so much excitement, that the governor of Nagasaki was obliged to calm the people by issuing the following proclamation: "Considering that the body of the malefactor has rendered service to medical science, and consequently administered to the public good, the government has permitted the dissection during the past day. That which remains of the body will receive honorable interment, with the attendance of the ministers of religion."

The first hospital under foreign direction in Japan was opened at Nagasaki by Dr. Van Meerdevort, in 1861, with the concurrence of the Taikoun. The first year it received 930 patients of both sexes, and 100 students were allowed to attend the clinics of the director. This hospital has been, and is now, in a flourishing condition.

The whole number of cases of all diseases admitted to the sick-list of the United States steamer Lackawanna during the year 1873 was 226. Of these cases 2 died, 5 were sent to hospital, 219 returned to duty. The percentage of diseases of all kinds, which disabled the ship's company from duty, was 8.

The whole number of cases of syphilis admitted to the list and excused from duty during the year was 20, and there were also 12 cases treated not excused from duty. All returned to duty, with the exception of one sent to the naval hospital. There are, at the close of the year, 4 on the list with syphilis; 4 on duty show traces of disease. The cases of gonorrhea admitted during the year were 16; there were also 18 additional cases under treatment while performing duty. Six cases of gonorrhea were attended with or followed by orchitis, and three cases resulted in spasmodic stricture.

There were no evidences of any poisonous influence of a gangrenous or erysipelatous nature in any of the cases of disease treated. The Lackawanna, having but one deck, is comparatively well ventilated, although there is not, of course, a supply of 2,100 feet of air, which is considered necessary for an adult per hour. The presence of the galley upon the berth-deck helped to secure the circulation of air during the day, but failed at night. Under favorable circumstances it is believed to introduce 5,000 cubic feet of fresh air per hour. The air can never be said to be pure on the berth-deck, nor in the sick-bay, during the night.

The berth-deck measures 35 by 100 feet. Ventilation is some-

times neglected, because of its association in the minds of many with draught, even when there is only the proper renewal of the air by currents of insensible velocity.

Report of W. K. Van Reypen, M. D.,

Surgeon U. S. Navy.

U. S. S. Iroquois.

HYGIENE.

During the past year the Iroquois has been engaged in cruising about the coasts of China and Japan. From January 1, 1873, to March 12, 1873, she was stationed at the port of Shanghai. During the remainder of March, the month of April, and part of May the vessel visited the ports of Nagasaki, Kobé, and Yokohama, in Japan, returning to Shanghai in May, at which port she remained until the latter part of July, at that time going north and visiting during the summer the ports of Newchwang, Ninghai, Taku, Tungchau, Cheefoo, and Chinkiang, returning to Shanghai in October, and remaining there until the early part of December, when she came to Hong-Kong.

The complement of the vessel, officers and men, is 203. This number has almost invariably been maintained, very little difficulty having been experienced in obtaining recruits, as the ship, after her arrival on the station, acquired and maintained an enviable reputation for regularity, discipline, and efficiency. The interests of the men were carefully guarded, their wants attended to, and their comfort promoted in every way consistent with discipline.

The Iroquois, in common with other vessels of her class, labors under the disadvantage of limited accommodations for the crew. The berth-deck has so much of its available space occupied by the galley and the cook's chests, that the forward

part of it presents more the appearance of a kitchen with men sleeping around the stove than the berth-deck of a vessel of war. The greatest allowance of cubic air-space for each man on the berth-deck is 80 feet, and this is much reduced in wet or cold weather, when the berth-deck is overcrowded with men.

The percentage of sickness during the past year has been 0.0405; the percentage of mortality .0055.

The vessel is ventilated, as is usual, by hatches and air-ports, and in warm weather with wind-sails judiciously arranged. The usual lights are allowed on board.

The vessel is warmed by means of steam-heaters throughout the ship. These answer an admirable purpose, and, with ordinary attention, can always be regulated so as to give the men the necessary degree of warmth, and not render them susceptible to sudden changes of temperature.

In Japan, water from the shore was used; in China distilled water, except at the ports of Hong-Kong and Shanghai. In former years, to the use of the water at Shanghai had been attributed malarious fever and bowel affections, but the water now supplied by the Poolung Filtering Water-Works is of excellent quality and inconsiderable cost. It can be used with confidence. Since the establishment of the works this water has always been supplied to the Iroquois while the vessel was in the port of Shanghai, and no semblance of disease could be traced to its use.

The ordinary Navy ration of food, sufficient in quantity and good in quality, has been issued to the men, with a liberal allowance of fresh provisions when in port. Monthly money has been paid to the men with great regularity, and they have drawn largely upon the resources of the bumboat for additional mess supplies.

It has been especially the care of the medical officers to ascertain that no unripe fruit or indigestible articles of food should be allowed on board for sale.

The clothing supplied has been the usual naval outfit, the style and manufacture of which is not in the province of a medical officer to criticise. It is to be hoped, however, that some more useful and comfortable article for summer headwear than the present style of cap, with white cover, will soon be adopted. It is a fallacy to suppose that the addition of a white cover to a heavy cloth cap renders the head of the wearer more cool. The adoption of a straw-hat or a light linen cap for summer wear is demanded alike by comfort and hygiene.

I cannot too earnestly recommend the removal of the galley from the berth-deck of vessels of the Iroquois class. I am at a loss to understand why there should be any difference of opinion as to the expediency of this change. When the men are sleeping below, and before the galley fires are lighted, the atmosphere is so thoroughly impregnated with exhalations and corporal emanations as to be almost irrespirable. One has only to go on the berth-deck at 2 or 3 o'clock in the morning, while the galley fires are being lighted, and listen to the sounds of coughing, choking, sneezing, and swearing which reach his unwilling ears through an atmosphere of dense smoke, which, notwithstanding the galley-funnel, will persist in filling the berth-deck and permeating every opening in the awakened sleeper's blanket, under which he is trying to shield himself from suffocation, to be made fully conscious of a sailor's discomfort, entailed upon him by an untoward adherence to improvable arrangements.

The sick-bay is on the forward part of the berth-deck, separated from it by a bulk-head aft, and from a small sail-room forward by a thin partition. It is small and inadequate, and has often been partly given up for the temporary storage of sails and awnings, but it could not be enlarged without manifest injury to other parts of the ship, when every department feels itself cramped for space.

No epidemic diseases have appeared during the year, and but few serious cases of illness. The vessel has been kept thoroughly clean; the men have been exercised and encouraged to friendly competition; liberty on shore has been granted whenever the duties of the ship would permit; and the physical well-being of the ship's company has been promoted, as well by attention to the improvement of the *morale* of the men as to conformity to the recognized laws of hygiene.

MEDICAL TOPOGRAPHY.

The medical topography of the ports visited during the year is briefly noted. Shanghai is situated on the Woosung River, a branch of the Yangtsze, and about eighty miles from the sea. The whole of the surrounding country is an alluvial deposit, and there is not in the range of one's vision a single natural eminence to relieve the monotonous level. The foreign settlement is regularly laid out, with good sewers and surface-drainage. The water-supply is obtained from the Poolung Filtering Water-Works, or by treating the river-water with alum. Epidemic diseases rarely occur among the foreign population, although in 1863 cholera appeared and continued during the summer. Malarious diseases are of comparatively infrequent occurrence, and are readily amenable to treatment. In the summer bowel affections, almost invariably connected with hepatic complications, are common. In these cases calomel is of great service.

Shanghai has a large general hospital, under control of the Sisters of Charity. It is under excellent supervision, and sick from the Navy are received at moderate rates.

Newchwang, Ninghai, Taku, Tungchau, and Cheefoo are ports on the Gulf of Pecheli, in the north of China. In each of these ports the foreign population is quite limited, and they are merely ports of call for vessels of the United States Navy. There are

no public hospitals at either of the above-mentioned places. Cheefoo is often visited during the summer by vessels of war. It possesses a fine harbor, and the climate is bracing; convalescence rapidly occurs in persons who have been debilitated by a continuous summer residence in Southern China. Chinkiang, on the Yangtsze River, is inhabited by but few foreign residents. The health of the place is so good, that a physician who was settled there left from lack of support.

Nagasaki, Japan, is beautifully situated at the head of a land-locked bay, quite surrounded by high hills, which afford it protection from the cold north winds. With the exception of an occasional mild epidemic of small-pox, it is a remarkably healthy port. It has no public hospital accommodations. Kobé is the principal open port on the inland sea. It is situated on a plateau extending by a gentle slope from the hills to the sea. It is a place of rapid growth, and apparently will become one of the principal commercial ports of Japan; at present it has no public hospital accommodations. Epidemic diseases are unknown, and the place is healthy, with exceptional cases of malarious fever.

Yokohama, which has until recently been the headquarters of the United States squadron in Japan, is divided into two towns, an upper, on the bluff, comprising the dwellings of the principal foreign residents and the United States Naval Hospital, and a lower town, on the plateau, comprising the business-ness-houses. It has been free from epidemics, but malarious diseases are not unusual in the lower town.

The ports visited by the Iroquois during the past year comprise the principal ports visited by the United States vessels on the Asiatic station. It is my experience that with reasonable hygienic precautions and an avoidance of the southern ports during the summer months the crews of vessels of war on this station are no more liable to disease than in ports of the United States.

REPORT OF D. MCMURTRIE, M. D.,

Surgeon U. S. Navy.

U. S. S. ASHUELOT.

HYGIENE.

The full complement of officers and men is 166, though the average number of the ship's company has not been above 145. Cubic air-space allowed each individual on shipboard, 150 feet; percentage of sickness, 3; mortality, 0.61.

Ventilation.—The berth-deck, immediately below the spar-deck, is ventilated by three large hatches (supplied with wind-sails in the hot season) and by six air-ports on either side. Cabin is provided with a sky-light and three air-ports on either side. The wardroom has a sky-light at either end and an air-port to each state-room. A large hatch and two air-ports, on either side, supply the steerage. By means of the sky-lights, the cabin and wardroom are each furnished with a wind-sail in warm weather.

Notwithstanding these seemingly abundant means of ingress and outlet for the atmosphere, still much suffering and illness are caused, during the hot summer-months, by the high temperature that obtains on shipboard by reason of the vessel's hull being constructed entirely of iron, a substance possessing such great capacity for heat. This, in a sanitary point of view, seems to me a serious defect in iron vessels. It might be modified in part by giving the air-ports a larger diameter, say ten or twelve inches, instead of seven, and still further by protecting the ship's side from the sun by a vertical awning rigged out at a distance of three or four feet from the side to allow circulation of air.

The engine-room derives its chief supply of air from the large open crank-room above. It is also supplied with a hatch

aft. The fire-room is supplied by a large open hatch on the spar-deck, by communication with the engine-room, and by four large funnel-shaped cylinders from the hurricane-deck.

Lighting.—The same openings that afford ventilation also supply an abundance of light to all parts of the vessel, except the state-rooms, dispensary, issuing-room, &c. Larger air-ports would remedy this defect.

Warming.—In cold weather the berth-deck, cabin, wardroom, and steerage are each warmed and rendered comfortable by means of a stove proportioned to their several dimensions.

Water.—Chief source has been from distillation. At Tientsin the filtered Peiho water was used extensively for cooking and washing. It is very hard, containing lime, potassa, magnesia, and sand and nitrogenous organic matters from the inundated plains in the neighborhood. On account of the presence of the latter alone, I did not consider the water potable. I cannot but coincide with those sanitarians who affirm that water of moderate hardness, *cæteris paribus*, is always to be preferred to that which is entirely soft. At Nagasaki and at Yokohama we received supplies of water from shore. The specimens were all clear, transparent, and crystalline in appearance to the naked eye, and all contained lime-salts in variable quantities.

The supply of fresh water issued has uniformly been sufficient for the necessities and comfort of the ship's company.

Water is preserved on board in two iron tanks, containing about thirteen hundred gallons each, and they of course always impart an additional element to their contents, the sesquioxide of iron.

Food, consisting of the usual salt ration, alternated with fresh beef and vegetables twice or thrice a week, has been of fair quality, and well prepared by experienced cooks. At Tientsin a supply of hard bread, there manufactured, was obtained. It proved of excellent quality. The soft bread was inferior,

was insufficiently aerated, and badly baked. The salt beef supplied from the public stores has been uniformly of inferior quality, all stale, and much of it decomposed and offensive to smell. It was generally consumed, however, with but little complaint on the part of the crew.

Clothing.—The commencement of the past year found us in a cold climate, with little or no clothing in store fit for issue. The few woolen articles on board were moth-eaten and ill-preserved. Accordingly, substantial beaver-cloth and flannel were purchased on shore, from which the men made their own garments. Warm fur caps of dog-skin were also obtained and issued. Substantial boots and shoes and woolen socks likewise purchased on shore. Later in the year, when warm weather set in, blue flannel and sheetings, both of fair quality, were issued from the public stores. Straw hats were worn by the sailors, between the hours of sunrise and sunset, instead of the uncomfortable uniform-caps.

It is suggested that a suitable sun hat or cap be devised for both sailors and marines, and authorized by the Department. Also, that a cool linen mustering-suit be prescribed for marines, to be worn in hot climates.

CLIMATOLOGY.

I regret that the Bureau's order reached me so late in the year that I could procure no data for this subject, the ship's logs having been forwarded to the Department.

I may state, in general terms, that during our stay of nine months and a half at Tientsin, China, we experienced a very dry climate, and were subject to great thermometrical changes. It is what may be termed an excessive climate, with a far greater range of temperature than is usual within the same parallels of latitude. Rains were moderate and at long intervals. Lowest temperature occurred in January, when the ther-

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mometer fell to 8° Fahrenheit; highest, up to date of our leaving the Peiho, was 107° Fahrenheit, in the month of June. Prevailing winds in winter, from the northward and westward, very strong, and darkening the air with dense clouds of dust. In summer, light southerly and easterly winds.

We arrived at Nagasaki, Japan, about the middle of July, and at Yokohama about the middle of August. During the first two months after our arrival in Japan, rain was of frequent, almost daily, occurrence. The thermometer never registered any high temperature, but the great humidity of the atmosphere rendered it exceedingly oppressive and enervating. During the last three months, the climate in and about Yokohama has seemed perfection; weather mild and fair in the extreme. Temperature very equable throughout the day, and nights cool and sleep-inviting. But little rain during this period, and harsh winds of very rare occurrence.

MEDICAL TOPOGRAPHY.

Tientsin, where we spent the first half of the past year, is situated on the Peiho, in a very flat, level, tract of country. There are less than a hundred foreign residents, and it was impossible to procure any statistics of disease among the native population. Up to a recent date the settlement has been eulogized as one of the healthiest places in China. But in the summer of 1871 the plains round about were inundated by the overflowing of the Yellow River, and the water has continued to cover a very large tract of country ever since. The flood extended across the provinces of Shansi and Chihli, and is said to have covered an area of fifty thousand square miles. Crops were destroyed, and a great expanse of fertile country lost to agriculture, whereby ruin and starvation were visited upon thousands and thousands of its dense population.

The very natural result of the presence of this large body of

of fresh water was malarial fevers, which, more than all other disorders together, furnished recruits for the sick-list from time to time during our stay in the Peiho.

The other ports visited during the year are in Japan—Nagasaki, Kobé, Yokohama. The former is noted for its beautiful harbor, deep, spacious, and surrounded by highlands on all sides. The town is built on its eastern side, in a valley and on the slopes of the hills, and is well sheltered from the dreadful gales known as typhoons, which constitute the great scourge of the country and the peril of the adjoining seas. Kobé and Yokohama occupy more exposed situations, and at these places those storms usually commit great devastation; though their effects are doubtless much modified by the distinct and timely notice which they give of their approach.

The prevailing diseases in all three of these ports are rheumatism and *kakke*, (Beriberi.) The former seems to be indigenous to the soil, and is doubtless owing to the great humidity of the atmosphere which prevails throughout the greater part of the year. It is that form of rheumatism which attacks the white fibrous tissue, and is unattended with acute inflammatory symptoms. The joints become stiffened and the limbs painful on motion; digestion is soon impaired, anæmia supervenes, and the constitution rapidly breaks down.

Kakke is an obscure but frequently fatal disease peculiar to the islands of Japan. Up to the present time none but the native population are known to have suffered with it, but many observers concur in regarding the disorder as identical with beriberi, a disease which has been extremely frequent and fatal among the troops in Ceylon and India, both Europeans and natives. Like beriberi, kakke is a constitutional disease which makes its advances in an insidious manner, without any primary or well-marked train of symptoms. The indisposition is slight which exists as a stage precursory to the visible invasion.

Patients are first attacked with some stiffness or rigidity of the legs and thighs, succeeded by numbness, culminating in acute œdema, sometimes paralysis of the lower extremities; breathing oppressed; countenance swollen and bloated. The œdema is general throughout the connective tissue of muscles and of solid and visceral organs in every cavity of the body. Effusion of serum into the serous cavities very generally precedes death, which is often very sudden. Kakke differs from beriberi in that it oftenest attacks the robust, the first symptom being the anæsthesia of the lower extremities, (as losing the shoe unconsciously;) while the majority of phenomena which characterize cases of beriberi are undoubtedly referable to anæmia. Another point of difference is the immunity of foreigners from the former disease. Both disorders are said to prevail most extensively in the cold, wet season in the spring of the year; in both one attack predisposes to another; and both are commonest among the inhabitants of the sea-coast and well-watered valleys and the districts about the mouths of rivers. An elaborate paper on the subject of kakke was recently prepared by Dr. Hoffman, of Yedo, and published in the Japan Mail. He asserts that kakke and beriberi are distinct diseases, but he does not prove them to be so.

There are no medical publications in any of the ports we have visited, nor medical societies. There was no hospital for treatment of foreigners at Nagasaki, but Kobé and Yokohama have each a native hospital, and a general hospital under the management of Europeans, and containing a charity ward. There are in Yokohama, besides, the hospitals belonging to the United States and to the English and French governments. Happily, no epidemic has occurred to fill their wards during the past year.

Report of J. G. Ayers, M. D.,

Passed Assistant Surgeon U. S. Navy.

U. S. S. Saco.

I joined the Saco at Nagasaki, Japan, on the 1st of last September; she left that port a few days afterward, and on the 15th of that month arrived at Yokohama, where she has been stationed since. From my brief connection with this squadron and limited field for observation, I can furnish but little information, which I propose to embrace in my report for 1874. I report under the following heads:

HYGIENE.

Complement of officers and men, 137; cubic air-space allowed to commanding officer, 1,798 feet; to each wardroom-officer, 339 feet; to each steerage-officer, 442 feet; to each man, quarters, berth-deck, and forecastle, 90 feet; average cubic air-space allowed to each individual on shipboard, 131 feet. Percentage of sickness, 128.43; of mortality, 1.96.

Ventilation.—Cabin: sky-light, 2½ feet in diameter, through which a wind-sail is used in warm weather; two stern-ports, 3 feet by 2 feet 2 inches; two side-ports, 3 by 3 feet; four air-ports, 7 inches in diameter; one lattice-window, 22 by 12 inches; six lattice-windows, 22 by 13 inches, opening into the cabin companion-way. Ventilation good. Wardroom: two sky-lights, respectively 3 feet by 2 feet 6 inches and 3 feet by 2 feet 8 inches; two ports in navigator's and paymaster's rooms, 3 by 2 feet; eight air-ports, 7 inches in diameter; five windows in forward bulk-head and doors, 24 by 15 inches; and wind-sails in both sky-lights in warm weather. Ventilation comparatively good, but would be greatly improved if there were larger air-ports; they should be square, at least one foot in diameter,

similar to those very generally used in vessels of the English navy, and could be constructed without much impairing the strength of the hull. Steerage: one hatch, 5 by 3½ feet; two copper tubes, 1 foot in diameter and projecting 1 foot above the spar-deck; six air-ports, 6 inches in diameter, which can never be kept open except when lying in very smooth water, and almost never in the harbor of Yokohama. No wind-sails can be used, but a draught is secured in warm weather by a door communicating with the engine-room. The tubular ventilators should rise much higher above the deck, and a wind-sail should be substituted for one of them in warm weather. Air-ports should be larger. Berth-deck: three hatches, respectively 5½ by 5½, 3 by 2½, and 5 by 3½ feet, the two latter opening into the forecastle; two wind-sails used, except in cold weather; and six air-ports, 6 inches in diameter, which can be kept open only under the same circumstances as those of the steerage. There should be two cylindrical ventilators, well aft, which should rise several feet above the spar-deck; these could be easily removed when exercising with the 11-inch gun. Over the forward hatch, through the deck of the topgallant forecastle, is a circular opening 1 foot 10 inches in diameter for a wind-sail; this should be larger. There should also be a hatch or a sky-light of ample dimensions over the other hatch communicating with the forecastle, to admit a wind-sail, and a bowsprit, properly constructed of iron, would afford additional air. Four more air-ports would be of great advantage for lighting if they could not always be kept open for ventilation. Forecastle: open aft, except in very cold weather, when it is closed by a curtain or screen; the aperture through the deck overhead, above mentioned, and two ports, 3 feet 4 inches by 2 feet 6 inches. Ventilation sufficient. Engine-room and fire-room: besides the draught through the furnaces, there are three hatches, with an area of 182 square feet; two copper tubes, with an area of 201 square inches each, bent over at the tops and funnel-shaped,

and so constructed as to permit of their being trimmed to the wind. Wind-sails are fitted to each of these three hatches when necessary, and the ventilation can be said to be all that is required in this part of the vessel.

Lighting.—Lighting of quarters of officers and men chiefly effected by the same means as mentioned for ventilation. Fixed lights, burning oil and sperm candles, employed at night, With the improvements suggested above for ventilation, and several dead-lights in the spar-deck, lighting would be ample throughout the ship.

Warming.—All quarters heated this winter by coal-burning stoves, but there are facilities for heating by steam. No defects to report.

Water.—Water distilled on board was used until the arrival of the ship at Yokohama; since then the supply has been obtained from the Fairmount water-works, which are fed from springs situated some three miles from the Bund in the Ota Hills. This water, considered by many to be the best here, is led through wooden pipes, a distance of about half a mile, to a canal, where it is taken into boats. I have personally inspected its sources, and thus far have found it good.

The shipping of the harbor is also supplied from several other sources, the principal being springs flowing from the base of the bluff near the foreign cemetery, and the Rogo River. Water from the latter is brought in a wooden aqueduct a distance of fifteen miles, and is considered objectionable on account of the impurities of the river itself and liability to contamination in transit from defective construction of the pipes, which are led through paddy-fields and low grounds the greater part of the distance. Surgeon C. H. White, U. S. Navy, has analyzed these several waters, and I presume stated the results of the analysis in his sanitary report for 1873.*

* See report of Dr. White for 1873, *ante*.—H. C. N.

Food.—When in port, fresh beef is substituted for salt beef or pork, and fresh vegetables for the articles usually issued with the salted meats, four times a week; and one ration in about ten is commuted for the benefit of the messes, with which, and two dollars a month contributed by each man, articles such as flour, vegetables, and fish are purchased on shore. Food is prepared entirely in iron utensils.

Clothing.—The clothing is such as is usually issued throughout the Navy. I would suggest that straw hats be supplied to the men for wear in warm weather.

Hygienic suggestions.—There have been a large number of cases of venereal disease among the men during our stay at Yokohama, contracted chiefly among unlicensed prostitutes living in Honmura and other suburbs, who frequent the drinking-saloons and lodging-houses visited by them. I have thus far met with but one case contracted at the Yoshiwara, the precinct to which some four hundred licensed women are confined, subject to rigid weekly examinations under the direction of a medical officer detailed from the English navy, the diseased being selected for hospital treatment.

I would suggest that some steps be taken to urge the municipal authorities to abolish this irregular prostitution for the better protection of our seamen. Several thousand dollars would thus be saved annually in the way of expenses for hospital treatment and transportation home of men disabled by venereal affections.

CLIMATOLOGY.

No meteorological register was kept for the last four months of the year, during nearly all of which time this vessel was stationed at Yokohama. A very correct register was kept at the naval hospital at that place. My meteorological register commences with the year 1874.

MEDICAL TOPOGRAPHY.

Under this head I have but little of interest to report. The types of diseases prevalent here vary but little from those found in the same isothermal zone elsewhere, the only notable exception, perhaps, being a disease, of infrequent occurrence, termed in the native vernacular, *kakke*, which is identical with beriberi, presenting the same features which are described as peculiar to this affection in India. During our stay here, Yokohama has been very healthy, no epidemic prevailing. Owing, however, to extensive alterations in the grading of the streets, malarial fever has prevailed to some extent among the foreign and native population, but the miasmatic influences have been but slightly felt among the shipping.

The only institutions here for the treatment of the sick, besides the United States Naval Hospital, which is greatly superior to any in the place, are the English Naval Hospital, with 70 beds; the Yokohama General Hospital, with 30 beds, and supported by subscription of the foreign residents; the Municipal Hospital, for the use of the native population, containing 70 beds, and under the charge of Dr. D. B. Simmons, a very excellent physician; and the hospital connected with the Yoshiwara, for the treatment of women with venereal diseases. I have visited these institutions, and have not observed anything worthy of note.

REPORT OF JOSEPH B. PARKER, M. D.,

Passed Assistant Surgeon U. S. Navy.

U. S. S. YANTIC.

The United States steamer Yantic was placed in commission at Norfolk, Va., August 13, 1872, and sailed from Hampton

[redacted] Officers and crew numbered [redacted]. The following ports have been visited, and in the order here given: Boston, Alexandria, Port Said, Suez, Aden, Zanzibar, Seychelles, De Gale, Penang, Singapore, Hong Kong, Amoy, Formosa, Nagasaki, Shanghai, Nagasaki, Hong Kong, Formosa, Hong Kong, Nagasaki, Shanghai, Amoy, Swatow, Hong Kong, Manila, Iloilo, Zebu, Sooloo, Labuan, Singapore, Galle.

* * * * * * *

With the exception of a few cases of intermittent fever at the time of sailing from Norfolk, August 28, 1872, the health of the ship's company was good until the arrival of the vessel at Hong Kong, April 17, 1873, when a large number of the ship's company suffered from diarrhœa and dysentery. These diseases were not of a persistent character, and yielded readily to treatment, but reappeared from time to time until our arrival at Yokohama, Japan, July 11, 1873. During the stay of the vessel at Hong Kong rain was frequent, and followed by intense heat of the sun; this, in connection with a diet of fresh meats, fruits, and vegetables, the ship having made long passages under sail, may have caused these intestinal disorders. On our second visit to Shanghai, October 5, 1873, the same diseases again appeared, but assumed generally more of a dysenteric character, and it is probable, had our stay been protracted, that the company would have been disabled, as it was prevalent and fatal among native and foreign residents. Before leaving Hong Kong, November 10, for the Philippine Islands the disease had entirely disappeared. Venereal diseases have been abundant, but, with few exceptions, of a mild form. At Yokohama ulcers were contracted, gonorrhœa the exception. While at Hong Kong and Shanghai gonorrhœa was prevalent, an ulcer the exception. But three cases, as yet, indicate constitutional infection. In obedience to instructions, these cases

as they appeared were reported to the proper authorities, and, in some instances, liberty was denied until they were reported convalescent. After the promulgation of the order many of these cases were concealed from the medical officer, and only an aggravation of the disease led to a discovery.

No other diseases of interest have appeared. While passing through the Red Sea and across the Indian Ocean landsmen were called upon for the first time to perform arduous duty in the fire-room, which resulted in frequent appeals to the medical officer for admission to the sick-list or release from this duty. This was not unexpected, as a similar experience occurred during a former cruise. To inure them gradually to this duty, and thereby avoid probability of injury to health, it was found necessary to make the watches two hours, not one having had any previous experience in the fire-room, and many of them not possessing the physical development required if selected specially for this duty. It is only justice to the majority of these men to state that they endeavored to perform this duty, and that, when complaints were made of prostration, their appearance generally verified the statement. At a later period a spirit-ration of an ounce and a half was administered at the end of the watch, as was reported to the Bureau during the first quarter, 1873. Before reaching Singapore the men were standing four-hour watches, the spirit-ration was discontinued, and no further trouble has been experienced. Formerly it was necessary for those connected with the engineer's department to wash on the forecastle, undergoing, in consequence, a great and sudden change of temperature. For their better protection a bath-room, situated under the forecastle, has been secured; at night, however, some difficulty attends its use on account of hammocks and men asleep on deck.

The system of steady berth-deck cooks has been persevered in, and only the recommendation of the medical officer, when

impaired health is observed, causes an exchange. Landsmen are always eager to perform this duty, and never voluntarily resign it, as they escape the more disagreeable duty in the fire-room and coal-bunkers.

The berth-deck of this vessel is 59½ feet in length; breadth from aft forward, at distances of 8 feet, 26, 25, 22, 19, 14, 4; height, 6 feet; average cubic space, 5,538 feet. From this is deducted 1,040 feet for torpedo-locker, issuing-room, dispensary, mess-chests, bags, mast, knees, and pump-box. Hammock-hooks, 14 inches apart, are supplied for 100 men; cubic air-space allowed each man, 45 feet, the same as is allowed coolies on Pacific Mail steamers. To change the air of this deck three times every hour, as is necessary according to our best authorities to preserve health, would be difficult, if not impossible, under the most favorable circumstances, on account of the very deficient means for ventilation and lighting. It has 3 hatches—after one, 30 square feet; central, 16 feet; forward, 6 feet—the last two opening under the forecastle—and 10 air-ports, more correctly dead-lights, each 41 square inches. The latter are of no use as ventilators, on account of close proximity to the water-line. It is only in the most placid harbor that they can be opened, and even here the passing of a small boat causes water to flow onto the deck. Still less benefit is derived from those that open into the dispensary, issuing-room, yeoman's room, and brig. During wet weather the men congregate on this deck, and with the after hatch covered the air soon becomes offensive and nauseating. In pleasant weather very few inhabit it, and then only in the vicinity of the hatches, sleeping in preference on the spar-deck, under awnings, where they will undergo actual suffering from cold or saturation with rain before going below. I ascribe the general good health of the crew, however, to their forced abode on the spar-deck; yet

pleurisy, rheumatism, and catarrh have resulted from exposure to inclement weather.

Recently a ventilator with movable cowl has been passed through the forward hatch to the berth deck, which, with the wind-sail aft, when set, greatly improves the circulation, but not to the extent desired. It is not carried as high above the rail and head as might be done, nor as far into the deck as is required for perfect circulation. Its appearance and space occupied are the objections. Every effort has been made to keep this deck dry as well as clean, and to accomplish this it is covered with matting, which is taken up daily and the deck swept.

The ship's complement is 136, and of this number about one-third occupy hammocks, the remainder distributing themselves about the spar-deck, under the forecastle, and on the berth-deck near the hatches. Having passed both winters in the tropics, they have been able to live constantly in the open air, and only appear to suffer during wet weather. It is probable that disease would develop during severe weather if the crew were compelled to confine themselves to the narrow limits of the berth-deck and forecastle.

The forecastle is 45 feet in length; greatest breadth, 25¼ feet; supplied with hooks, 14 inches apart, for 41 men; cubic air-space allowed each, 133 feet; contains galley, mess-chests, carpenter's chest, scuttle-butt, bath-room, lockers, officers' closets, opening directly on the spar-deck; the ventilation and lighting are much better than below, especially in port, when two gun-ports are open, and, as would be expected, more hammocks are used here than elsewhere by those fortunate enough to secure a berth.

The steerage allows each occupant 280 cubic feet. Has one hatch, opening under the break of the poop, of 20 square feet; originally had two funnel-ventilators extending above the rail,

but these were removed and movable deck plates substituted, as it was found impossible to prevent water leaking at these places into the bunks below. Ventilation is derived chiefly from a door communicating with the engine-room when the wind is forward of the beam; at other times the air is oppressive, and the occupants are frequently compelled to sleep on deck. It contains six air-ports, each 41 square inches; but here, as on the berth-deck, they are of no use as ventilators. It is only when the awnings are furled that candles can be dispensed with here and on the berth-deck.

Wardroom-cabins afford 145 cubic feet. The wardroom is well ventilated and lighted by means of doors and windows opening on the spar-deck, two hatches, each 6 square feet, eight air-ports, always open, and two gun ports, which are always open in port, and often at sea.

In consequence of the overcrowded condition of the ship, very imperfect facilities for the treatment of the sick are afforded. It is only on the berth-deck near the after hatch that a hammock or cot can be swung without great inconvenience to the patient as well as the ship's company, and even here the sick fail to obtain the rest required, as it is the main entrance to and exit from the deck, the point where rations are issued, and appointed officers' mess, and where hold or lockers are continually broken open. No means for warming the ship has been provided, nor could it be done below without detriment to health on this dark and badly-ventilated deck. Water was obtained from shore at Gibraltar, Palermo, Seychelles, Singapore, Hong-Kong, Shanghai, Nagasaki, Yokohama; when cruising, it is furnished by the distiller. Four iron tanks are supplied, each receiving five hundred gallons, which supplies the ship about ten days. Two of these tanks are placed midships, below the berth-deck, and two in the wings of the ship; the former can be cleaned, but not the latter; they are filled by our flow-pipes

from the midship tanks. The water is carried directly from the condenser into the tanks, and a large quantity of it is always consumed before it is in a proper condition to drink. It requires three and four days to replenish with the distiller, and during this time and several days after, additional discomfort is experienced by those whose duties compel them to remain below. No ill-effect could be traced to the water supplied from shore. It was always of excellent quality, so far as superficial examination could determine, and contained no organic or inorganic impurity.

Salt and preserved meats, of good quality, have been issued at sea, the former five times and the latter twice weekly. Of the salt, pork is issued three times and beef twice; in connection with this, flour, one-half a pound; dried fruit, one-eighth of a pound, are issued. With the preserved meats, (beef and mutton.) rice, two-thirds of a pound; butter, one-sixth of a pound; desiccated potatoes, one-sixth of a pound, are issued. The hard bread obtained on the station is made partly from rice-flour, and is of good quality. In port, the crew has been furnished liberally with fresh meats, vegetables, and soft bread. No objection has ever been made to the preparation of the food, and, as a rule, it is served in such a way as to preserve its nutritive properties as well as could be expected on board ship under the present system.

The clothing furnished has been chiefly woolen, and of good quality. The overshirts, undershirts, drawers, and canvas-duck pants, have been unusually good, and wear well. Satinets have been of inferior quality. Boots and shoes simply durable, and not such as the crew desire and should have. It is seldom that a properly-fitting shoe can be obtained from the ship. They are heavy, inflexible, and generally cripple the wearer for a week or two, as well as cause abrasions which necessitate at times admissions to the sick-list. At Hong-

Kong and Shanghai clothing was procured on shore. The quality and durability were equal to that supplied by the Government, and had the advantage of being cheaper, fitting the men, and giving the entire company a neater appearance.

In conclusion, I would respectfully offer the following suggestions:

1. That our single-deck ships should not be overcrowded.
2. That they be constructed with a view to better ventilation and lighting.
3. That some better provision be made for treating the sick and making them more comfortable.
4. That facilities for bathing be introduced.
5. That water-tanks be arranged with a view to cleaning them.
6. That water should not be carried from the condenser directly into the tanks.
7. That vessels of this class cruise south during the winter, when it is possible, changing officers and crew.
8. That men be selected specially for duty in the fire-room and coal-bunkers.
9. That no one be allowed to serve longer than one month as berth-deck cook.
10. That clothing, especially shoes, be supplied to order from shore.

MANILA.

The island of Luzon lies between north latitude 12° 10′ and 18° 43′. It is of irregular form, about five hundred and fifty miles in length, and its greatest breadth one hundred and thirty-five miles. A range of mountains traverses it from north to south, and by divisions and subdivisions extends over the island in many directions, which gives it a very mountainous appearance. A geological examination has never been made, and

little is known beyond its volcanic formation, yet it is not believed to be exclusively so.

The city of Manila is in latitude 14° 36′ north, longitude 120° 52′ east, and lies on the banks and at the mouth of the river Pasig, a small but very rapid stream, which, after a course of thirty miles, empties into the bay. It has a large bar at its mouth, which, at low water, is partly exposed. The right bank is protected by a substantial stone wall, which is one of the frequented and popular promenades. This river receives the sewerage of the city, but it is probable that no deleterious influences result therefrom, unless it should be from sediment deposited on the left bank near its mouth, as the current is remarkably rapid. The city consists of two parts, a fortified town, lying on the south or left bank of the river, and the suburb, on the north or right bank. The old or fortified city has the form of an irregular triangle, of which the sea forms one side, the land a second, and the river the third. The walls are of solid masonry, and on the land and sea faces have bastions, with embrasures, and a deep, broad ditch, the last double on the land side. It consists of a number of straight, narrow streets running in one direction, with as many at right angles to them, and one small square. Within its precincts are contained all the public buildings, such as the palaces of the governor-general and archbishop, the town-house, court of justice, cathedral, arsenal, barracks. The population within the walls is estimated at 15,000; and this, perhaps, is not much exaggerated, judging from the compact manner in which it is built. The streets appear to be well drained, and are kept scrupulously clean. It is probable that disease results from the overcrowded condition of this portion of Manila. The houses are substantial two-story buildings, the upper one occupied and the ground-floor let for business purposes. The mass of the population dwell outside the walls, and are reckoned at 150,000. It

is here that the large business-houses and manufactories are located. This portion of the city, not being circumscribed, covers relatively a much greater area, contains good roads, and a handsome promenade through an avenue of trees. The inhabitants consist of natives of the various islands of the Philippine group; of Chinese and their creoles and mestizos; Spanish, with their creoles and mestizos; and the original natives of this portion of the island, the last comprising the greatest number.

The rainy season continues five months, from May until October; and during this time it is not unusual for rain to fall for ten days without intermission. At this time the lower parts of the country are submerged, the rivers overflow their banks, and the public roads become impassable. It is probable that the low land in the vicinity of the city always contains more or less water, and this no doubt increases, if it does not altogether cause, the malarial diseases from which the inhabitants suffer. The lowest annual rain-fall is stated at 84 inches, the highest 114; average, 98. The thermometer never falls below 72°, nor rises above 95° F., the range being 23°. The most frequent diseases are intermittent and remittent fevers, diarrhea, dysentery, and pulmonary consumption, the last most frequent among the mestizos. Among cutaneous diseases, small-pox and elephantiasis are the most frequent and malignant.

ILOILO.

The island of Panoy is the largest of the Philippine group, except Luzon and Mindanao, and the most fertile and densely populated. It is separated from Negros by a channel four miles wide. To the north, it is distant ninety miles from Luzon, and to the south, one hundred and thirty miles from the nearest part of Mindanao. The form of the island is triangular, the base being to the north and the apex to the south. Its greatest

length is ninety-five miles, and its area is computed at three thousand nine hundred and sixty square miles. A chain of high mountains runs through it from north to south.

Iloilo, latitude, 10° 4′ north, longitude, 122° 36′ east, the name of the European settlement, as also of the province in which it is situated, is a small, irregular, unimproved village of twelve or fifteen houses on the left bank and near the mouth of a winding and muddy stream. The European population does not exceed 30. Within a circuit of ten miles are several large native settlements—their houses built of bamboo placed upon piles, about 5 feet from the ground—with a population estimated at several hundred thousand. The land in the vicinity of the settlements is low, marshy, and inundated during the rainy season. In many places the roads are thrown up several feet above the surrounding country. The general character of the inhabitants and the diseases met with here are much the same as at Manila. Geology and meteorology thought to be similar also. Very little is known concerning the island, and a brief stay here, as elsewhere, prevented further authentic information. As is well known, very little can be obtained from the people, generally, on account of ignorance and not possessing any written history.

ZEBU.

The island of Zebu lies between Negros, to the west, and Leyte, to the east, being divided from the first by a narrow strait and from the last by a broader one. To the north it has Masbate, and to the south Mindanao, the first one hundred and sixty-one, and the last forty-one miles distant. In form Zebu is long and narrow, its northern half being the broadest. Its length, from northeast to southwest, is eighty miles; its average breadth fifteen miles, and its area one thousand eight hundred and forty-three square miles. A chain of mountains traverses the island through its whole length. Its rivers are small, and gen-

erally unfit for navigation or irrigation. Zebu, the town of the province by this name, is in latitude 10° 17′ 13″ north, longitude 123° 57′ east, and is situated on the eastern shore, opposite the little island of Maetan, celebrated as the place of death of Magellan. It lies on a small river, which divides it into two parts, and contains about 1,000 houses and 6,000 inhabitants. The few streets are generally straight and at right angles.

The principal buildings are the episcopal palace, the cathedral, and the church of San Augustine. The Spanish mestizos live in a quarter of the city apart from the rest of the inhabitants. It is stated that less rain falls here than on the other islands of the Philippine group. The climate is very sultry, and would be oppressive were it not for the regularity of the sea-breezes. The suburbs contain excellent roads, well-cultivated farms, and a profusion of tropical vegetation. The land is much higher than in the suburbs of Manila and Iloilo, and better drained. The surface, in many places, is sandy, stony, and uneven. Nothing is known of its geological formation, but it is not thought to be volcanic. The inhabitants are the same as at Manila. The diseases are malarial chiefly, but less frequent and severe. It is not regarded as an unhealthy place by the few Europeans residing here, considering its tropical situation.

LABUAN.

The island of Labuan lies off the north and west coast of Borneo, and is distant from that island fifteen miles. It extends from north latitude 5° 11′ to 5° 25′, and from east longitude 115° 10′ to 115° 25′. Its form is triangular, the base being to the south and the apex to the north. Its greatest length is twelve miles, and its average breadth between five and six—its area being about thirty-four square miles, and its coast-line thirty. The highest land does not exceed 300 feet. The geological formation is sedimentary, consisting of sand-

stone, clay, and slate. Coal is found in the island, and the mines are being worked. The base or south end of the island is six miles in length, and contains two bays, on the smallest and deepest of which, and on its eastern shore, is the small town named Victoria. Off the southern end of the island, and extending toward Borneo, there are two small islands, the largest of which, called Döat, forms a protection to the harbor and town. Swamps and sand in many places cover the island, but the greatest part of the soil is a dark, yellow loam, and well adapted for cultivation. The greater part of the island is still a forest, but rapidly being cleared. In the marshy parts of the forest mangroves, rattans, and palms are abundant, and, on the higher grounds, larger timber-trees, among them one species of camphor, (*Dryobalanops camphora.*) This island was ceded to the English in 1846, and before that time was destitute of inhabitants. Population, chiefly Chinese, about two thousand, engaged in the coal-mines. It is also used as a penal colony. The same malarial diseases exist here as elsewhere, and the climate, no doubt, has prevented the rapid development of the colony. When originally settled it was almost impossible for a European to reside here, but the removal of a portion of the forest has mitigated these diseases.

BATAVIA.

The island of Java lies between 105° 12′ and 114° 4′ east longitude, and 5° 52′ and 8° 40′ south latitude. Its extreme length is five hundred and seventy-five miles, and its breadth varies from forty-eight to one hundred and seventeen. Its area has been computed at 37,029 square miles. The geological formation is volcanic.

Batavia is in south latitude 6° 8′ and east longitude 106° 50′, and consists of an old and new city, situated on the shores of a bay sixty miles wide. The bay is studded with small islands,

and is not of great depth. The land on which the city stands is little above the level of the sea, and consists of a recent alluvial formation, with substrata of clays, sand, and marls. The new town, which originally was the suburbs of the old, and now occupied by all Europeans because of the insalubrity of the latter, lies farther inland, and is about 30 feet above the sea-level. Through both towns runs a river of moderate size, but with a rapid current, having its source among the mountains some fifty miles in the interior. It is stated that for some years after the foundation of the city by the Dutch the climate was not considered unhealthy, but when the city was modeled after those of the Netherlands the insalubrity became proverbial. The construction of canals connected with the river reduced its current, and caused the deposition of sediment which resulted in fatal malarial fevers. At a late period many of these canals were filled up, which restored partly the current of the river, and the health of the city improved. By some it is not at present considered more unhealthy than other places similarly situated. That malarial diseases exist, and in a degree of severity not usual in other places, cannot be concealed; and this probably is owing, in great part, to the canals which still exist. There is little doubt but that the climate has prevented the improvement and prosperity found in other cities of the East settled long after. Intermittent and remittent fevers, diarrhea, and dysentery are very common, severe, and exist at all seasons of the year. During the fall of 1873, and previous to the visit of the Yantic, an epidemic of cholera of unusual severity prevailed in the city and surrounding country, destroying hundreds of inhabitants. The population of the city is estimated at 400,000, and consists of many races and nationalities. The Chinese form the largest foreign population, and are estimated at from fifty to one hundred thousand. They occupy the old quarter of the city.

Annual abstract of meteorological observations for the year 1872.

[Singapore, Straits Settlement.—Latitude 1° 17′ north; longitude 103° 51′ east.]

Date.	Barometrical readings corrected and reduced to 30° F.					Thermometers.								Hygrometrical results.			Self-registering thermometer.					Rain-fall in 24 hours.	Mean direction of wind.
						9 a. m.		3 p. m.		9 p. m.		Means.											
	9 a. m.	3 p. m.	9 p. m.	Daily range.	Means.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Mean temperature of dew-point.	Mean elastic force of vapor.	Mean degree of humidity, saturation = 100.	Maximum in sun's rays, (*in vacuo.*)	Maximum in shade.	Minimum in shade.	Diurnal range.	Approximate temperature.		
1872.						°	°	°	°	°	°	°	°	°	*Inches.*	°	°	°	°	°	°	*Inches.*	
January	29.906	29.812	29.888	0.094	29.869	79.6	73.5	83.5	74.5	77.3	73.1	80.1	73.7	69.3	0.716	69.4	143	86.1	71.7	14.4	78.9	2.83	N. E.
February	29.893	29.791	29.866	0.102	29.850	79.1	74.6	81.3	75.4	76.5	73.7	78.9	74.6	71.7	0.777	78.4	137	84.5	71.7	12.8	78.1	8.25	N. E.
March	29.903	29.787	29.869	0.116	29.853	81.7	75.5	84.5	76.5	77.8	74.4	81.3	75.5	71.6	0.774	72.8	158	87.3	72.0	15.3	79.6	3.36	S. E. and N. E.
April	29.843	29.734	29.820	0.109	29.799	83.4	77.7	83.9	77.5	79.1	76.2	82.1	77.1	73.7	0.832	76.0	155	87.6	74.3	13.3	80.9	3.97	S. E.
May	29.869	29.754	29.833	0.107	29.816	81.0	78.0	86.0	77.8	81.2	76.9	83.7	77.6	73.6	0.829	71.6	155	88.6	74.6	14.0	81.6	6.13	S. E.
June	29.835	29.742	29.810	0.093	29.796	82.9	77.9	84.5	77.9	80.0	77.0	82.2	77.6	74.3	0.848	76.4	143	87.1	74.9	12.2	81.0	5.03	S. E.
July	29.856	29.764	29.833	0.092	29.818	81.7	76.6	84.0	77.0	83.7	76.7	83.1	76.8	72.6	0.801	70.8	139	86.5	74.4	12.1	80.4	5.44	S. E. and S. W.
August	29.861	29.765	29.829	0.096	29.818	81.2	76.5	83.0	76.5	80.1	76.2	81.4	76.4	73.0	0.812	76.0	139	85.6	74.7	10.9	80.1	9.27	S. E. and S. W.
September	29.877	29.778	29.848	0.099	29.834	81.7	76.5	83.4	76.8	79.1	76.2	81.4	76.5	73.2	0.818	76.4	139	86.4	73.0	13.4	79.7	12.82	S. W.
October	29.880	29.761	29.831	0.119	29.824	82.1	76.7	84.4	77.7	79.7	76.6	82.1	77.0	73.5	0.826	75.6	143	86.9	73.4	13.5	80.1	6.22	S. W. and S. E.
November	29.835	29.720	29.813	0.115	29.789	81.6	76.9	82.6	77.4	78.4	75.9	80.9	76.7	73.9	0.837	79.9	146	86.5	73.3	13.2	79.9	13.52	N. W.
December	29.853	29.749	29.829	0.104	29.810	80.3	75.7	82.6	76.2	77.7	74.9	80.1	75.6	72.6	0.801	77.6	129	85.5	72.5	13.0	79.0	7.98	N. E. and N. W.
Monthly means.	29.868	29.764	29.839	0.104	29.824	81.6	76.3	83.6	76.8	79.2	75.6	81.5	76.2	72.6	0.801	74.8	144	86.5	73.4	13.1	76.9	7.07	
Total																						84.82	

Highest reading of barometer in the year..... 29.985 inches.
Lowest reading of barometer in the year..... 29.645 inches.
} Height of cistern above sea-level, about 30 feet.

In the shade { Highest temperature observed. 92°
Lowest temperature observed. 67°

Greatest rain-fall in 24 hours ..... 3.10 inches, at Convict Hospital, 12th September.

Comparative annual abstract of meteorological observations for the years 1869 *to* 1872. *Singapore, Lat.* 1° 17′ *N., Long.* 103° 51′ *E.*

Months.	Mean readings of—																				Rain-fall. Convict Jail.				Number of days on which rain fell at Convict Jail.			
	Barometrical reduced and corrected to 32° Fahrenheit.				Maximum thermometer in the shade.				Minimum thermometer in the shade.				Daily range.				Approximate temperature.											
	1869	1870	1871	1872	1869	1870	1871	1872	1869	1870	1871	1872	1869	1870	1871	1872	1869	1870	1871	1872	1869	1870	1871	1872	1869	1870	1871	1872
					°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	*In.*	*In.*	*In.*	*In.*				
Jan.	29.922	29.770	Barometer damaged.	29.869	84.8	84.1	84.3	86.1	72.4	71.9	71.4	71.7	12.4	12.2	12.9	14.4	70.4	78.0	77.8	78.9	3.93	18.25	11.56	2.83	12	24	19	6
Feb.	29.912	29.814		29.850	88.3	83.9	86.0	84.5	73.9	72.5	72.6	71.7	14.4	11.4	13.4	12.8	81.1	78.2	79.3	78.1	3.23	7.80	7.27	8.25	12	21	21	20
Mar.	29.867	29.802		29.853	89.2	87.1	85.6	87.3	74.6	73.0	72.6	72.0	14.6	14.1	13.0	15.3	81.9	80.0	79.1	79.6	3.37	3.15	14.05	3.36	8	14	22	11
April.	29.862	29.777		29.799	87.3	87.9	88.5	87.6	75.6	74.6	74.0	74.3	11.7	13.3	14.5	13.3	81.4	81.2	81.2	80.9	9.23	8.81	3.33	3.97	16	17	8	13
May.	29.804	29.778		29.816	88.0	87.8	88.6	88.6	75.9	74.6	74.5	74.6	12.1	13.2	14.1	14.0	81.9	81.2	81.5	81.6	9.19	5.01	4.13	6.13	16	10	14	12
June.	29.806	29.796		29.796	87.1	85.8	87.0	87.1	76.8	74.1	74.3	74.9	10.3	11.7	12.7	12.2	81.9	79.9	80.6	81.0	6.81	11.51	5.56	5.03	11	17	13	16
July.	29.818	29.803	29.842	29.818	86.9	86.9	84.5	86.5	76.1	74.3	73.1	74.4	10.8	12.6	11.4	12.1	81.5	80.6	78.8	80.4	5.42	5.11	12.17	5.44	13	11	19	17
Aug.	29.828	29.759	29.836	29.818	84.7	85.7	85.8	85.6	74.4	74.0	74.0	74.7	10.3	11.7	11.8	10.9	79.5	79.8	79.9	80.1	12.31	11.36	8.51	9.27	18	17	20	14
Sept.	29.846	29.824	29.833	29.834	87.4	85.8	85.4	86.4	74.8	73.7	73.7	73.0	12.6	12.1	11.7	13.4	81.1	79.7	79.5	79.7	3.13	12.62	9.12	12.82	12	18	20	17
Oct.	29.833	29.826	29.824	29.824	87.0	86.4	85.8	86.9	74.6	73.1	73.8	73.4	12.4	13.3	12.0	13.5	80.8	79.7	79.8	80.1	5.11	9.99	14.92	6.22	15	17	20	19
Nov.	29.836	29.830	29.820	29.789	84.5	86.2	85.2	86.5	73.2	73.6	73.1	73.3	11.3	12.6	12.1	13.2	78.8	79.9	79.1	79.9	8.24	11.50	14.63	13.52	21	25	20	23
Dec.	29.816	29.841	29.860	29.810	84.6	83.6	84.6	85.5	73.3	72.1	72.0	72.5	11.3	11.7	12.6	13.0	78.9	77.9	78.3	79.0	20.66	18.13	15.19	7.98	26	18	16	18
Monthly means.	29.846	29.802	29.836	29.824	86.6	85.9	85.9	86.5	74.6	73.5	73.2	73.4	12.0	12.4	12.7	13.1	80.6	79.7	79.5	79.9	7.55	10.27	10.03	7.07	15	17	19	15
Total.	.....	.....	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	90.63	123.24	120.44	84.82	...	...	...	...

	1869	1870	1871	1872
Highest reading of barometer	30.017	29.983	29.973	29.985
Lowest reading of barometer	29.664	29.611	29.684	29.645
Highest temperature	92°	93°	91°.5	92°
Lowest temperature	69°	69°	69°	67°
Greatest rain-fall in 24 hours, inches	*5.61	†6.25	‡4.20	§3.10

*On the 31st of August. †On the 26th of December. ‡On the 8th of January. §On the 12th of September

Tabular statement of diseases and injuries on board the United States steamer Yantic from August 13, 1872, to January 1, 1874.

Order and class of diseases.	1872—Third quarter.				1872—Fourth quarter.			1873—First quarter.				1873—Second quarter.			1873—Third quarter.				1873—Fourth quarter.				Total cases in 1 year and 141 days.
	Admitted.	Discharged to duty.	Transferred.	Continued.	Admitted.	Discharged to duty.	Continued.	Admitted.	Discharged to duty.	Died.	Continued.	Admitted.	Discharged to duty.	Continued.	Admitted.	Discharged to duty.	Transferred.	Continued.	Admitted.	Discharged to duty.	Transferred.	Continued.	
CLASS I.																							
Order I:																							
Febris intermittens	6	6	...	...	2	2	...	3	3	...	...	7	7	...	1	...	...	1	1	2	...	...	20
Febris remittens	1	1	...	...	1	1	...	2	1	...	1	...	1	...	...	...	...	...	...	...	...	...	4
Order II:																							
Syphilis primitiva	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	1	3	4	...	...	5
Syphilis consecutiva	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Gonorrhœa	1	1	...	...	...	...	...	...	...	...	...	3	3	...	...	...	...	...	2	2	...	...	6
Order III:																							
Alcoholismus	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	...	...	...	...	...	...	3
Delirium tremens	...	...	...	...	...	...	...	2	2	...	...	1	1	...	1	1	...	...	...	...	...	...	4
CLASS II.																							
Order I:																							
Adynamia	1	...	...	1	...	1	...	...	...	...	...	...	...	...	3	3	...	...	...	...	...	...	4
Anæmia	...	...	...	...	6	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
Rheumatismus chronicus	2	1	...	1	4	5	...	4	4	...	...	7	7	...	8	6	...	2	4	4	1	1	29
Order III:																							
Vermes	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	2	2	...	...	3
CLASS IV.																							
Order I:																							
Cephalalgia	5	5	...	...	6	6	...	5	5	...	...	...	...	...	4	4	...	...	1	1	...	...	21
Dementia	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Insolatio	1	1	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Neuralgia	1	1	...	...	1	1	...	...	...	...	...	6	6	...	1	1	...	...	1	1	...	...	10
Order II:																							
Conjunctivitis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	1

Tabular statement of diseases and injuries on board the United States steamer Yantic, &c.—Continued.

Order and class of diseases.	1872—Third quarter.				1872—Fourth quarter.			1873—First quarter.				1873—Second quarter.			1873—Third quarter.				1873—Fourth quarter.				Total cases in 1 year and 141 days.
	Admitted.	Discharged to duty.	Transferred.	Continued.	Admitted.	Discharged to duty.	Continued.	Admitted.	Discharged to duty.	Died.	Continued.	Admitted.	Discharged to duty.	Continued.	Admitted.	Discharged to duty.	Transferred.	Continued.	Admitted.	Discharged to duty.	Transferred.	Continued.	
CLASS IV—Continued.																							
Order III:																							
Otalgia												5	5		1			1	1	2			2
Otitis																							5
Order V:																							
Hypertrophia cordis								1		1													1
Palpitatio					1	1		1	1														2
Order VI:																							
Bronchitis acuta															3	2		1		1			3
Bronchitis chronica	1	1																					1
Catarrhus	5	4		1	2	3						9	9		5	5			8	8			29
Laryngitis															1	1							1
Pleuritis					1		1				1	1	2		1		1						3
Order VII:																							
Cholera morbus					1	1						1	1										2
Colica					8	8		3	3			3	3		2	2			3	3			19
Constipatio	1	1										1	1						2	2			4
Diarrhœa acuta	2	1		1	10	10	1	6	7			29	26	3	18	21			5	5			70
Diarrhœa chronica					5	4	1	1	2			1	1										7
Dysenteria acuta								1	1			1	1		2	2			5	4		1	9
Dysenteria chronica	1	1																					1
Dyspepsia	1	1						1	1			4	3	1	4	4	1		2	2			12
Icterus					1	1		1	1														2
Tonsilitis					5	4	1	1	2			1	1						1	1			8
Order VIII:																							
Orchitis					1	1						3	2	1	1	1	1		1			1	6
Enuresis																			1	1			1
Urethræ strictura																			1	1			1

Tabular statement of diseases and injuries on board the United States steamer Yantic, &c.—Continued.

Order and class of diseases.	1872—Third quarter.				1872—Fourth quarter.			1873—First quarter.				1873—Second quarter.			1873—Third quarter.				1873—Fourth quarter.				Total cases in 1 year and 141 days.
	Admitted.	Discharged to duty.	Transferred.	Continued.	Admitted.	Discharged to duty.	Continued.	Admitted.	Discharged to duty.	Died.	Continued.	Admitted.	Discharged to duty.	Continued.	Admitted.	Discharged to duty.	Transferred.	Continued.	Admitted.	Discharged to duty.	Transferred.	Continued.	
CLASS IV—Continued.																							
Order IX:																							
Caries					1	1																	1
Order X:																							
Abscessus								1	1						3	3							4
Adenitis								2	1		1	1	2		1	1							4
Furunculus	3	3			14	12	2	13	14		1	5	1		5	5			3	2		1	43
Herpes								1	1														1
CLASS V.																							
Adenoma																			2	2			2
CLASS VI.																							
Order I:																							
Abrasio					1	1									1	1							2
Contusio	3	3			2	2									1	1							6
Fractura					1	1		1	1			3	1	2		2							5
Stremma					2	2		3	2		1	1	2		3	3			3	3			12
Vulnus contusum	4	4			3	2	1	10	11			4	3	1	9	9		1	10	11			40
Vulnus incisum	3	3			1	1						1	1										5
Vulnus lacceratum								2	2						2	2							4
Vulnus punctum					1	1						1	1										2
Total	43	38	1	4	81	78	7	67	68	1	5	100	97	8	86	84	3	7	63	65	1	4	440
Average number ship's company	152				150			145				138			140				149				
	49 days:				92 days:			90 days:				91 days:			92 days:				92 days:				
Average number patients	5 11-49				5 71-92			6 80-90				7 52-91			5 62-92				5 33-92				5.74
Average sick per 1,000	34 34				38.46			47.57				55.00			40.50				22.55				39.72
Average deaths per 1,000								.008															.46

Report of T. D. Myers, M. D.,

Assistant Surgeon U. S. Navy.

U. S. S. Monocacy.

HYGIENE.

The complement of this vessel is 13 officers and 154 men. The cubic air-space allowed each individual on shipboard is, on berth-deck, 95.35 feet per man; starboard-steerage, 601 feet; port-steerage, 395 feet; wardroom, 654 feet; cabin, 2,321.10 feet.

Percentage of sickness for the year, $3\frac{50}{167}$; of mortality, 0.

While in port the ventilation of the berth-deck of this vessel is sufficient. At sea, when the air-ports must be closed, and when the weather is bad, and the hatches are battened down, there is absolutely no ventilation except that caused by the upward movement of the heated air of the fire-room. The means used to secure the ventilation of this important part of the ship are three large hatches and twelve large air-ports. The defect in ventilation is that common to all vessels, viz, the absence of means by which to discharge the noxious gases, &c., which are heavier than air. This defect can only be remedied by introducing a current of cold, fresh air at the bottom of the deck. This may be accomplished in many ways; perhaps one of the simplest, and the best, is by the use of the ventilating-funnels suggested by Dr. Gihon.* They should project six or eight feet above the spar-deck, and have movable cowls; hooks or buttons should be around the inner side of the lower end, to which a short wind-sail could be attached for conveying the air down to the lowest stratuus of the berth-deck.

Both steerages are well ventilated by a large double hatch over the steerage-country; this hatch can be kept open in

* Practical Suggestions in Naval Hygiene, by A. L. Gihon, M. D., Med. Inspector U. S. Navy.

almost any weather. The port-steerage has two large air-ports; that on the starboard side has one; these, as well as those on the berth-deck, are available for ventilating purposes only in port.

The wardroom is only fairly ventilated by two sky-lights, and by nine air-ports available in port. The bulk-head between the wardroom and steerage countries is nearly solid; only about a third of it is of lattice-work. The defect here is the same as that on the berth-deck, and could be remedied in the same way.

The cabin is well ventilated by a single hatch and two small sky-lights, which can be kept open in almost any weather. There are seven air-ports, but these are only available when the vessel is at anchor in very smooth water. Ventilation is also assisted here by the flue of a grate recently introduced by the commanding officer for the purpose of heating the apartment; this is a valuable addition to the means of ventilation, and it is the only example of undercurrent ventilation on board this vessel.

The engine-room has ample ventilation through the crank and valve rooms.

The fire-room is well ventilated by four large iron ventilating-funnels, which project some eight or ten feet above the hurricane-deck. This room is open at the top throughout its whole extent, being covered by iron gratings only. Ventilation is also assisted by a large ash-chute. With these numerous escapes, and the rapid upward movement of the air heated below, this is one of the best ventilated portions of the ship. The mean temperature of the fire-room, when the vessel is under way, with the usual number of fires lighted, is 90° Fahrenheit.

This vessel is well lighted throughout by means of the numerous hatches, sky-lights, and ports, mentioned above.

During the winter months the berth-deck and the wardroom

are warmed by stoves; these are very objectionable, because of the comparatively small space really warmed and the irregular temperature established. Some six months ago I recommended that steam-heaters be employed, and although the recommendation was approved by the commanding officer, the fleet-surgeon, and the admiral then commanding—the vessel being under extensive repairs at the navy-yard at Yokoska, Japan—the recommendation has not been carried out. Both steerages and the chart-room on the hurricane-deck are heated by steam-coils. The cabin is warmed by a grate recently introduced; it seems to answer the purpose well. Steam-coils should be introduced into the wardroom and on the berth-deck.

The fresh water on the coast of China and Japan is proverbially bad. It is usually so contaminated with organic matter that it is unfit for drinking and cooking purposes on board of vessels of war. Before the year 1871 exception was made by the English admiralty to certain ports on the coast where it was thought the water could be used in safety, but in that year the admiral commanding on the East India station was instructed to allow "distilled water only" to be used for drinking and cooking purposes. I have been informed that since this order has been in force there has been a marked decrease in the number of cases of diarrhea and dysentery in English vessels. The horror of these diseases, which formerly rendered a cruise along these coasts so destructive to life, has now well-nigh passed away.

In our own naval service exception is made in favor of the port of Hong-Kong, where the water may be used in comparative safety, it being almost free of organic impurities. It contains a large percentage of lime and potash salts, but not in sufficient quantity to materially increase the percentage of sickness. The water at all the other ports on the coast is bad, and should never, in my opinion, be permitted to come on board a vessel

of war, except in cases of absolute necessity. The peculiar system of agriculture employed has a very baneful effect upon the water throughout China and Japan. Irrigation, with superficial drainage, and the use for centuries of liquid fertilizers must cause the contamination of most of the wells and small streams from which the supply is obtained. Recent attempts have been made at Shanghai to filter the water of the Woosung River through animal charcoal, but these have not succeeded in removing all of the impurities, and the water is still too full of organic matter to be used on board ship without great risk to the health of the officers and men.

The quality of the water distilled on board this vessel is excellent. It is preserved in four iron tanks, each having the capacity of 450 gallons. These are too small. The water does not have sufficient time to become properly aerated before it is used. The number of tanks should be increased, and distillation should always be commenced when the contents of half the number have been consumed.

While in port, fresh provisions are served out four days in each week. They are furnished by *compradores* in each port, and are of the best character. Salt provisions are served three days in each week; they are often of inferior quality, owing to the length of time they have been preserved, and to changes produced by climatic influences. The food of the men on board this vessel is often badly prepared, but mistakes of this kind are frequently due to disadvantages incident to life on shipboard, and, again, they are often due to the ignorance of the person selected to do the cooking. Under the present system, if any accident befalls the man regularly detailed for the performance of this duty, and who has, it may be presumed, gained some knowledge of the art by experience, a perfectly incompetent person may be selected to take his place because that person is useless on deck.

The full ration, both salt and fresh, is consumed. The hours at which the meals are served are, breakfast at 8 o'clock a. m., dinner at 12 o'clock m., and supper at 4 o'clock p. m. These hours are bad; the whole amount of food allowed in the twenty-four hours is consumed in eight, leaving sixteen hours of fasting just at the time when most of the exposure must be endured, and when the hardest work of the day must be done. By the expenditure of a few pounds more of coal, and the services of an extra man in the galley, the men having the night-watches could be supplied with a slice of bread and a cup of hot coffee before commencing the duties assigned them. Indeed, under the present system it would be better to have two ship's cooks, for it would save the lives of many valuable men who serve in that capacity now, and it would insure the presence at all times in the galley of at least one person with a slight knowledge of how the food of the sailors should be prepared.

The men on this vessel are supplied with clothing by the native tailors on shore. Underclothing sent out from home is esteemed, and is very durable, but the flannel shirts, cloth and satinet pantaloons, furnished from the store-houses, are so often damaged by long sea-voyages and by moths, and at best require so much attention, that both the pay-officers and the men find that it is cheaper to secure a well-fitting suit from a clothier on shore. There is so much in the effects of ill-fitting clothing, that it is, to my mind, much preferable to obtain clothing in this way, fresh from the hands of the tailor, than to compel a man to become disgusted with a suit before it is fit to be worn at muster. In summer, white clothing made of linen is worn, but I have insisted that light flannel should be worn next the skin. The men seldom have clothing enough to enable them to change if wet more than once during the day or night. The three suits recommended by Dr. Gihon are rarely seen. It would be well if the clothing-bags of the men

could be inspected monthly by the surgeon, and any deficiency reported could be immediately filled by order of the commanding officer.

On the 1st day of January, 1873, the United States steamer Monocacy was at Chin-Kiang, China. She was returning from Hankow, where she had been lying for several weeks. The valley of the Yangtse-Kiang was at the time unusually free from the diseases which commonly prevail there. Malarial fevers and pulmonary diseases are most frequent, but only a few cases presented themselves on shipboard; and even among the natives on shore a marked exemption was noticeable. There are only a few Europeans resident at Chin-Kiang, probably numbering twelve souls all told. During our stay, there was a heavy fall of snow, and the weather was cold and damp.

On January 18 we arrived at Shanghai, China. This port is situated in latitude 31° 15′ N., and in longitude 129° 29′ E. The old city of Shanghai and the European settlement are both situated on the north bank of the Woosung River, about twelve miles from its mouth. The country round about is flat, the cities being in the middle of a large plain, which is unbroken by any considerable eminence for many miles. Old Shanghai is a filthy city with very narrow streets and much business; the river-front is lined with junks from all parts of the kingdom, bringing and taking rice, pork, sea-grass, silk, &c. The European settlement is handsomely laid out just below the old city, on the same side of the river. The climate is remarkably insalubrious; the summers are warm and the winters are sometimes quite cold. The atmosphere is almost saturated with moisture at all seasons. Malaria abounds, and the diseases resulting therefrom are numerous and severe. Almost every ill that flesh is heir to finds here a favorable *nidus* in which to mature. Yellow fever is one of the exceptions; it has never existed here. Malarial fever of the remittent type, is, however,

often quite as fatal. The water used for drinking and culinary purposes is bad, as might be expected from the character of the surrounding country and the system of irrigation employed in agriculture. Every year large numbers of men in the numerous vessels in the harbor suffer from the effects of the water alone. Diarrhea from this cause is, however, easily controlled if taken at its commencement. When neglected, the only chance of recovery is in immediate removal. The water contains a large amount of lime and magnesia in solution. The organic impurities are immense in quantity, and all attempts to thoroughly filter them out have proved abortive. There is a fine large hospital here, with an excellent corps of attendants; the nursing is done by Sisters of Mercy. The medical and surgical staff is selected from the most able class of medical gentlemen in the settlement. The hospital-building is commodious and airy; it faces the south, and is easy of access from the harbor. There are several hospitals for the natives conducted by gentlemen connected with the various missionary societies.

The Monocacy arrived at "Pagoda anchorage" on the 10th of February, and remained there until the admiral and staff returned from a visit to Foo-Chow, twelve miles higher up the Min River. The whole valley of the Min is malarious, as was proved by the numerous applications from the people, both native and European, on shore for the sulphate of quinine. The water is unfit for use on shipboard, on account of the large amount of salines present, and the abundance of organic matter also to be found in it. There is a small mission hospital at Foo-Chow, but I was unable to gather any information concerning its working. The people (natives) of Foo-Chow are, according to Williams, morose and turbulent, and their dialect is harsh and guttural. The population of Foo-Chow, including the suburbs, is estimated at 600,000 souls, more than half of whom are addicted to the smoking of opium.

At Amoy, where we arrived on the 16th of February, there is a small hospital, intended for merchant-seamen. The institution is under the care of two of the medical gentlemen in private practice on shore. There is no regular corps of nurses. The water here is bad, and does not differ in chemical constituents from that at Foo-Chow.

Swatow, in latitude 23° 25′ north, and in longitude 116° 51′ east, was reached on the 20th of February. The native town is situated some two miles from the mouth of the river Han, at the anchorage, where all the business with Europeans is carried on. There is a mission hospital in the native town, where it is said that a large number of patients affected with urinary calculi are annually treated. I have not been able to collect any reliable information on this subject. Elephantiasis is said to be quite common. The water does not differ materially from that at Amoy. An excellent quality of sugar is exported in small quantity from this port.

On February 25 the Monocacy arrived at Hong-Kong. This city is well supplied with hospitals, the high character of which is too well known to demand any attention in this report. The water here is of fair quality, and may be used without positive danger.

We arrived at Canton on the 24th of March. The city, situated on the north bank of the Pearl River, was very healthy. Malarial diseases are, however, common, and elephantiasis and other forms of leprosy may be seen in the streets almost every day. There is a missionary hospital here, where a large number of patients affected with urinary calculi are annually treated. I have in my possession a tabular list of two hundred and twenty-five cases which have never been published in any work on the subject, all of which were operated upon in this institution. The water at Canton, it is said, has a larger amount of the salts of lime in solution than is found in that of other ports on the

China coast. This is particularly interesting, in view of the frequent occurrence of stone in the bladder.

On the 21st of July, 1873, this vessel reached Nagasaki, Japan, after having touched at all the ports noted above. The harbor is beautifully situated, and is almost surrounded by high hills. There is no marine hospital here. There are, however, two or three small institutions for the natives under the care of European medical men. The water here is almost free from animal matter, but it is very hard. Malarial diseases occur, but they are not frequent. Diarrhœa and dysentery are common, and people suffering from these diseases, contracted in China, do not appear to do as well as in more northern ports in Japan. Syphilis is wide-spread among the natives, but in this respect it is but little worse than all other ports in Japan and China.

We reached Yokohama, Japan, on the 28th of July, 1873. The city was almost free from those diseases most frequent during the summer-months. There are a number of hospitals in Yokohama; some of them are large and well known. Among these are the English and French hospitals for the troops stationed here, the general hospital, and the Naval hospital of our own Government, recently erected for the accommodation of the sick from the vessels of this squadron. Besides these, there are several institutions for the treatment of the natives, under the superintendence of American and English surgeons. Among these is the lock-hospital, to which all prostitutes who fail to pass the regular weekly physical examination are consigned. This institution, it is said by competent authority, has of itself greatly reduced the number of venereal cases in the city and among the shipping in the harbor. At some of the native hospitals clinical lectures are delivered by the surgeon in charge to the native physicians practicing in the city. There is always a class of students attached to these institutions. The water here is heavily loaded with salines. Organic

matter is also abundant in it. It should not be used, except under the demands of stern necessity.

On the afternoon of July 28, 1873, we reached Yokoska, a small, almost land-locked harbor in Goldsborough Inlet, about eight and a half miles south of Yokohama. The Japanese government has established a navy-yard and naval station at this place, and all the latest improved appliances for the building and repairing of steam and other vessels are to be found here. There is one large dry-dock now in use, and another nearly as large approaching completion. The yard is prettily laid out, and the buildings used as machine-shops, offices, &c., are large and well ventilated. There is a great quantity of fine machinery now in position and use, and much more that is awaiting the completion of proper buildings for its reception. The country round about possesses many points of picturesque and beautiful scenery. The many cone-shaped hills, made up of a soft shale and covered by bamboo-grass and a profusion of creepers, present a very pleasing sight to the sea-going man after a long cruise. There is a great scarcity of good potable water here; indeed that which is supplied to vessels undergoing repairs at the navy-yard is brought from Yokohama. This scarcity of water is likely to remain as a permanent injury to the place as a naval station. Malarial diseases are frequent, owing to the extensive cultivation of rice in the numerous little valleys adjacent. While this vessel was under repairs at the navy-yard a number of cases of intermittent and remittent fever occurred among the officers and men. Within the past year syphilis has spread among the natives to such an extent that this may be reckoned as one of those few ports on this coast where it is unadvisable to allow the crew to go on shore. There are no hospitals in Yokoska. Men too sick to be successfully treated on shipboard must be sent to Yokohama.

Report of W. M. King, M. D.,

Surgeon U. S. Navy.

U. S. Naval Hospital at Yokohama, Japan.*

HYGIENE.

The officers attached to this hospital are a surgeon in charge and a passed assistant surgeon.

The following is a summary of cubic air-space in wards and rooms of main building, wing, and contagious-ward. In principal ward of main building there is an air-space of 902.5 cubic feet for each bed, eight in number. In rooms Nos. 1 and 2, which are officers' rooms, containing two beds each, there is an allowance of 1,368.5 cubic feet of air for each patient. In rooms Nos. 3 and 4, also for officers, containing two beds each, there is an allowance of 1,188 cubic feet for each patient. The attendants' apartments, two in number, have an air-space of 1,164 and 1,356 cubic feet. The apothecaries' room contains 1,753 cubic feet of air. The two medical officers' apartments have contents represented by 2,682 cubic feet of air each. The wing of hospital contains eighteen beds, and has an average of 1,717 cubic feet of air for each patient. To this wing are attached two rooms for attendants, containing cubic-air contents of 592.5 feet each. The contagious-ward contains twenty beds, the allowance of air-space for each bed being 579.75 cubic feet. In this building are two officers' rooms, of two beds each, with an allowance of 987 cubic feet for each patient. During the past year 89 patients have been treated, and two deaths have occurred.

Ventilation.—In the ward of main building are four windows and three doors. In rooms Nos. 1 and 2 are three windows and

* This hospital was erected by the United States Government in the early part of the year 1872, and was opened for the reception of patients on the 16th of May of that year—H. C. Nelson, Surgeon U. S. Navy, being in charge. On that date a number of sick were received from the United States vessels lying in the harbor of Yokohama. A plot of the hospital grounds and a ground plan of the hospital buildings, furnished by Dr. Nelson, accompanies this report.

one door each. Rooms Nos. 4 and 5 have two windows and a door each. The two nurses' rooms have one window and a door each. In one medical officers' room there are three windows and two doors, the other having three windows and one door. The apothecaries' room has one window and one door. The dimension of every window is the same, viz, 87.5 by 45.5 inches. Doors the same in each apartment, viz, 88 by 38 inches, except one door leading from ward to veranda, measuring 94 by 47 inches. The ward in wing of hospital has eight windows, measuring 76.5 by 43 inches each, and four doors 88.5 by 47 inches each. The two rooms for nurses have two windows, 60 by 28 inches each. In one room there are two doors, the other having only one. Dimension of doors the same, viz, 88.5 by 33 inches. The contagious-ward has eight windows and one door. The two rooms for officers three windows and one door each. Dimension of every window and door the same, viz, 58 by 35 inches for window, 87 by 41 inches for door.

Defective ventilation principally in wing and contagious-ward, which could have been decidedly improved by movable sky-lights in the center of the ridge of each of the buildings referred to, or such other means as are adopted in the pavilion style of hospital. This could have readily been accomplished when the buildings were put up.

The means of lighting the various apartments are ample, consisting of the windows above enumerated.

The hospital is warmed by large coal-burning stoves, distributed as follows: Ward in main building, 1; ward in wing, 2; contagious-ward, 1; rooms for sick and medical officers, one small stove each, with the exception of rooms for officers in contagious-ward, which are furnished with two wood-burning stoves.

Water.—The principal supply of water is from a well on hospital-grounds, 67 feet in depth, which furnishes an ample quantity of potable water. There are also eighteen wooden tanks, in bad condition, for rain-water, but this supply cannot be de-

pended upon in dry weather. A qualitative chemical analysis of the well-water gives the following result:

Solid constituents, 13.5 grains to one gallon. Silicic acid; chloride of sodium; carb. of magnesia; sesquioxide of iron; sulphate of lime, (trace.)

The food is in accordance with diet-tables in the book of Instructions for Medical Officers of the United States Navy, is of excellent quality, and well prepared.

Clothing.—Patients have been permitted from time to time to purchase clothing from native tailors, which, upon examination, has been found to be far superior to the Navy issue.

CLIMATOLOGY.

Accurate meteorological records have been forwarded to the Bureau monthly during the past year; the record for the month of December accompanying this report. Herewith annexed is a digest of the meteorological report:

Tabular synopsis of monthly meteorological observations for the year ending December 31, 1873, at the United States Naval Hospital, Yokohama, Japan.

Months.	Average temperature.			Atmospheric pressure.				Rainfall.
	Maximum.	Minimum.	Monthly mean.	6 a. m.	9 a. m.	3 p. m.	9 p. m.	Inches.
January	46°	31°	39°.5	29.86	29.88	29.84	29.86	1.88
February	49	34	42	29.87	29.89	29.84	29.88	1.51
March	52	39	46	29.93	30.01	29.90	29.94	.89
April	64	52	57 .5	29.94	29.95	29.94	29.93	1.96
May	70	60	65	29.87	29.88	29.85	29.88	1.25
June	72	65	67 .75	29.86	29.86	29.84	29.86	10.25
July	83	77	78	29.87	29.88	29.86	29.87	1.90
August	84	77	81	29.92	29.93	29.91	29.92	2.31
September	77	70	73 .75	29.91	29.91	29.89	29.92	12.76
October	71	58	64	29.98	29.99	29.97	29.99	7.13
November	63	48	55 .50	29.98	30.00	29.97	29.99	2.75
December	57	40	49 .75	29.99	30.01	29.98	30.00	.59
Total								44.28

MEDICAL TOPOGRAPHY.

The diseases incident to Japan, and occurring among the foreign community, comprised of Europeans and Americans, do not

differ from the various maladies which belong to the same latitudes and occur within the same isothermal lines of other countries.

In making these general remarks it becomes necessary to state that the field of observation of the medical officers of this hospital has been limited to the Yokohama foreign settlement and its surroundings. The comparative absence of endemic disease, the immunity to a great extent from the fearful pestilences which occur as epidemics and ravage the habitable globe in all latitudes, the mild, equable, and genial climate, and the absence of high thermometric range, makes the north of Japan, and especially Yokohama, a most desirable sanitarium. Possessing all the benefits as a winter-residence of our southern latitudes, it has the superior advantage of a more moderate temperature during the summer-months than exists either in our Middle or Southern States. In this respect, also, Yokohama, in a sanitary point of view, compares most favorably with Southern France; and, moreover, in consideration of the total absence of bleak winds during the winter-months and the high diurnal temperature during the summer-season, it is decidedly preferable. Variola does occasionally occur as an epidemic, commencing almost invariably with the native population, the disease being propagated and nourished by the filthy surroundings which are observable wherever the lower orders congregate and live together. Under the same circumstances, zymotic diseases of this class flourish in more civilized countries.

Rubeola also is occasionally epidemic, occurring at intervals of many years, and frequently attacking those far beyond the age of puberty.

Typhoid fever is known simply as a sporadic disease.

There is a disease known to the natives of the islands of Japan, and endemic therein, called *kakke*, derived from the Chinese *kiak*, leg, and *ke*, air, and is supposed by foreign med-

ical writers to be identical with the Indian disease known as beriberi. The etiology of the disease is obviously obscure at the present time. Certain localities are presumed to be favorable to its development, viz, marshy land in close proximity to extensive rivers, and watered, low-lying meadow-lands. The spring of the year is the favorable season for the attack of the disease, and the advanced summer, after continuous rains, together with high range of temperature. Thus far the disease is only known to attack the native population, including the Ainos, or aborigines from Yesso. The symptoms of the disease are varied and numerous, including great muscular prostration upon the least exertion, anæsthesia and œdema of the lower extremities, precordial trouble, including palpitation of the heart, and even endocarditis. No cases have come under the observation of the medical officers of the hospital, and this brief outline has been obtained from foreign medical gentlemen in the Japanese service.

Eighty-nine cases have been treated in the hospital during the past year. Out of this number there have been 14 cases of primary and consecutive syphilis, 10 cases of chronic diarrhea, 3 cases of malarial disease, and the remaining cases of sporadic, constitutional, and accidental origin. With but few exceptions, the diseases have been contracted on the coast of China.

There are ten native hospitals, in charge of foreign medical gentlemen, distributed throughout the empire of Japan. Opportunities have been afforded of visiting the large native hospital in Yokohama, under the charge of D. B. Simmons, M. D., an American. The appointments and regulations are admirably adapted for the care and comfort of the class of patients received, and reflect great credit upon the skillful practitioner in charge.

In Yokohama there are also a French naval hospital, an English naval hospital, and a general hospital for foreigners. These have not been visited.

feet high, covered with trees, and former site of
se Temple and Tombs.

3, 3, 3. Drive. 4, 4, 4. Walks.

6, 6, 6. Grass Plats. 7. Flowers.

s. 9, 9. Offices. 10, 10. Bath. 11. Ward.

13. Surgeon s Bed Room.

n. 15. Office. 16. Assist. Surgeon.

18. Apothecary Room 19. Dispensary.

Room. 21. Linen Room. 22. Bath.

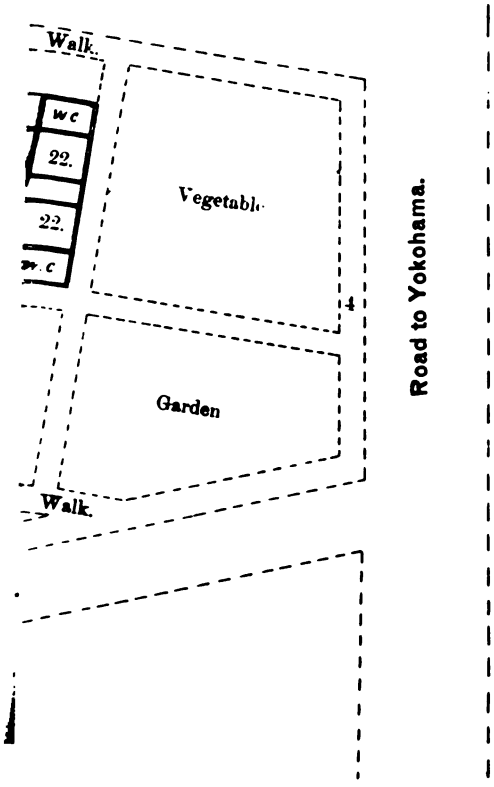
23. Covered Passage Way.

Way from Ward to Mens Mess Hall.

l. 26. Kitchen. 27. Pantry.

29. Store Room. 30. Mens Duds.

to Hospital. 32. Porters' Lodge.



A. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

SANITARY REPORTS.

NORTH ATLANTIC SQUADRON.

1874.

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NORTH ATLANTIC SQUADRON,

1874.

REPORT OF F. M. GUNNELL, M. D., U. S. N.,

Surgeon of the Fleet.

FLAG-SHIP WABASH.

Admiral A. Ludlow Case arrived at Key West on January 3 and assumed command of the station. The vessels from the United States, from Europe and Brazil, rapidly assembled, until the combined fleet consisted of twenty-eight vessels of all classes, including six monitors and the hospital-ship Pawnee, with a force of 6,754 officers and men.

The month of February was passed in Florida Bay in practicing fleet-maneuvers and in exercises in gunnery and torpedoes.

Excellent arrangements secured regular supplies of fresh provisions during the exercises.

The fleet returned to Key West early in March. Infantry and artillery battalions were landed with the marines, on two occasions, in a force amounting to 2,700 men, without accidents.

Constant drills with the great guns, torpedoes, and small-arms, and with the sails and spars, have been conducted, and with such regularity and practice that few and generally slight casualties have occurred. Notwithstanding this constant exercise, and perhaps in consequence of it in great degree, the health of the fleet has been excellent.

The Colorado suffered a visitation of cerebro-spinal meningitis in the early part of January—seven cases occurring, of which one was fatal.

Of this attack, with the attendant local causes, the Bureau

has been fully informed by the special report of Medical Inspector Coues, some time since forwarded. Prompt measures were adopted to improve the sanitary condition of that ship, which, since January, has been satisfactory.

A single case of the same disease has more recently occurred in the United States steamer Juniata, which was caused by imprudent bathing in the hot sun after violent exercise in rowing. The boy recovered after removal to hospital. It has been necessary to use the hospital-ship Pawnee on two or three occasions, when drafts of men have arrived from the North, as a receiving-ship. On one of these occasions the mumps appeared among the recruits. The disease was mild, and ceased upon the seclusion of the patients.

The Pawnee has been the subject of special reports from the surgeon of the fleet who preceded me and from myself. I desire to invite attention again to these reports and the recommendations made therein. In consequence of the condition of the vessel, it has been necessary on three occasions to stop sending sick men to the Pawnee. No cases of cerebro-spinal meningitis or of fevers of any kind have been sent there since December. Such patients are transferred to the marine hospital on shore. The season is approaching when fevers of severity may be expected to make their appearance, and proper preparation has been made for the care of those who may be affected. In my opinion, the accommodations afforded by the marine hospital and the sick-quarters at the Army post here, which have been generously placed at our disposition, are sufficient for all demands likely to occur in the diminished squadron that will remain after the dispersing of the present fleet.

An unusually large number of medical surveys have been held; and these have been necessary, not so much on account of sickness occurring aboard the vessels as from the large number of unfit men, too hurriedly enlisted, who were sent to duty

in the fleet. I have already called the attention of the Bureau to this in forwarding the surveys.

Most of the condemned men were sent North as soon as possible, but some remained in the fleet, who will be sent away in the first returning vessels.

The establishment of the medical store-house at Key West has been a valuable advantage to the medical department of the fleet. It is managed by Assistant Surgeon Perry with efficiency and courtesy.

With the medical topography and general character of Key West the Bureau has been thoroughly informed, and no special report on that subject is necessary.

No unusual causes of disease exist here. If the city authorities would interest themselves to secure a better condition of cleanliness in the streets and inclosures, its health would probably be good at all times. Yellow fever does not originate here, and an efficient quarantine may prevent its introduction.

During the quarter the range of the thermometer has been as follows: highest, March 25, noon, 82°, midnight, 81°; lowest, January 15, noon, 65°, midnight, 62°; average of the 90 days of the quarter, 74°.

In this great fleet, as in the similar collections of vessels in the late war, the interest of all officers has been directed to perfecting the efficiency of their ships and departments, and smaller interests and difficulties have been lost sight of. The sanitary condition of the fleet and of its several vessels has been made good and preserved so. The medical officers have had the assistance and enjoyed the consideration and authority that they desired in the discharge of their constant duties. And this has been in no small degree the result of the example of the Wabash, in which, with an excellent condition of health and cleanliness, and with thorough efficiency in drill and discipline, there has been proper consideration for the position and

forethought for the comfort of all on board. Not the least important element of a sound sanitary condition in the community, as in the individual, is comfort—comfort, with its attendant harmony, resulting from satisfaction of body and mind. To insure the enjoyment of this with efficient discipline in a military community is a problem which has not seemed always of easy solution.

The experience of this fleet, and its harmonious working, authorize the conclusion that wherever the same spirit prevails in the Navy, its traditional differences, growing out of misunderstandings and want of kindly confidence in official, as well as in personal relations, have no good reason for existing, and should be at an end.

The entire absence of strife and collisions, official and personal, in this large assemblage of vessels, with some hundreds of officers of all ranks, grades, and ages, is something more than exceptional, and may well invite the remarks of those who have the right to comment upon it.

Rear-Admiral Case transfers his flag to-day (April 1, 1874) to the United States steamer Franklin, to resume command of the European squadron, and has issued orders for the dispersal of the combined fleet, which terminates also my pleasant connection with it.

[The following indorsement of the commander-in-chief of the squadron appears on the report of Fleet-Surgeon Gunnell:]

FLAG-SHIP WABASH, KEY WEST, FLA.,
April 1, 1874.

In approving and forwarding this report, I desire to express my thanks to the medical officers of the fleet, and especially to Medical Inspector Gunnell, fleet-surgeon, for their unremitted efforts to maintain a good sanitary condition and to preserve a kindly feeling in the fleet.

A. LUDLOW CASE,
Rear-Admiral and Commandant in Charge N. A. Station.

Reports of Samuel F. Coues, M. D.,

Medical Inspector U. S. Navy.

U. S. S. Colorado.

Key West, Fla., *January* 4, 1874.

Sir: In view of the amount of sickness and the large number of severe cases of disease that have occurred on board this ship, I deem it my duty to present a special report in regard to her sanitary condition.

The fitting out of the vessel was hurried to such a degree that she sailed in an extremely dirty state. Up to the present time it has been necessary to use a large amount of water on all the decks to secure any degree of cleanliness. In consequence the ship has been very wet. Heavy weather at sea and accidents, which have occasioned a great deal of work, have interfered with usual sanitary precautions in some respects. The fact that there is a great excess of landsmen in the crew, of men incapable of taking care of themselves at sea, many of the recruits being in very bad physical condition, enfeebled by malarial influences previously to their enlistment, has largely increased the sick-list.

Three marked cases of cerebro-spinal disease have occurred. Two of them are convalescent; one terminated fatally at the marine hospital here, where I sent the patient by the advice of Dr. Peck, late surgeon of the fleet. These cases did not present the symptoms of epidemic cerebro-spinal meningitis. I do not ascribe their origin to a special endemic cause. I refer it, in each case, to lying upon the wet deck. The symptoms were those of congestion of the cerebro-spinal meninges. Other prevailing diseases have been intermittent and remittent fevers, originating mostly, I think, from previous exposure to malarial

poison, but developed by exposure to cold and wet. One suddenly fatal case of pneumonia and sundry cases of bronchitis, tonsillitis, &c., have occurred; also, a good deal of subacute and chronic rheumatism, and one serious case of acute rheumatism. A number of accidents have occurred since the ship went into commission, many of which have resulted from imperfection in material used in fitting out the ship.

Mr. Stevens, midshipman, is seriously sick with remittent fever, contracted originally on the Isthmus. He joined this vessel soon after recovering from a recurrence of the disease, and he has been a long time in a very delicate state of health. In his case the prognosis is very unfavorable, symptoms of cerebral congestion being very marked. There is at present no other very serious case of disease on board. The sick-bay is, of course, inadequate in size. It is tolerably well ventilated, but owing to a leak, which I am informed cannot be repaired, is almost constantly wet. Other medical accommodations are as good as usual.

Very respectfully, &c.,

S. F. COUES,

Medical Inspector United States Navy.

Surgeon of the Fleet F. M. GUNNELL,

United States Navy.

BAY OF FLORIDA, *February* 21, 1874.

SIR: In compliance with your request, I respectfully submit the following supplementary special report in regard to the sanitary condition and medical department of this vessel.

The recommendations of the medical board* have been as

* The commander-in-chief ordered a board of survey composed of medical officers, with the view of determining the best means to be adopted for improving the sanitary condition of the Colorado.

thoroughly as possible carried into effect; the hold broken out and restowed after thorough cleaning; the bilges cleaned and deodorized by the free use of sulphate of iron, carbolic acid, and lime; the defective plan of ventilating the bilges as far as possible remedied; the decks kept dry, and the most comfortable parts of the ship made available for the accommodation of the sick. The sanitary condition of the vessel I consider now perfectly satisfactory. The sick-list is much reduced in number. There are to-day but eight off duty, and not one serious case.

MEDICAL SURVEYS.

An unusually large number of men (twenty-seven of the crew and one officer) have been reported for medical survey, condemned as unfit for duty or for service, and sent north. There were so many cases of serious disease on board, with such a strong probability of increase in the number, that I considered it my duty to adopt this course in regard to all men whose diseases and disabilities rendered them unavailable, who were, in fact, mere impedimenta.

ORIGIN OF DISEASES.

The fact that enlistments were much hurried during the emergency that called this ship into service, and that many of the men were drawn from notoriously malarial districts, accounts for the large number of cases of fever. Of fifty-six admissions to the list with fever of miasmatic origin, twenty-five cases are known to have been due to exposure to the cause before entering the service. Seven are doubtful, and the probability is that but very few of the remainder can be fairly ascribed to exposure during this cruise. Of the cases referred to, eleven were re-admissions, none of which are of recent origin.

CEREBRO-SPINAL MENINGITIS.

But two cases of this disease (six in all) have occurred since the date of my former report, (Jan. 4, 1874.) A seventh case

showed symptoms of the affection, but the result proved an error in diagnosis. I see no reason to change my opinion, already expressed, that the origin of this disease should not be referred to special endemic influences, but rather to the antecedents of the patients; the conditions to which they were subjected on board being but an exciting cause. Reports of these cases, less in detail than I could wish, are appended.

The case of Midshipman Stevens, to which reference was made in my former report, terminated fatally on the 6th January. The gravity and obstinate persistence of the cerebral symptoms, of the congestion that caused death, are accounted for by the accidental discovery of a fibrinous clot which firmly plugged the right jugular vein near the heart. A report of this case is also appended.

I have nothing to add in regard to the predisposing or exciting causes of disease that for a time interfered with the exercises and organization, and impaired the usefulness of this vessel. The importance of a strict and careful physical examination of recruits is self-evident. I would suggest, however, that medical officers on recruiting duty be instructed to reject, summarily, every *doubtful* applicant, *especially in times of hurry and emergency*, for it is under such circumstances that objectionable recruits frequently escape their vigilance and cumber the service with useless and expensive material.

I would suggest that hammocks be made available for immediate use by being fitted with clews and supplied to the men before they have passed a night on board ship. I am convinced that lying on wet decks was a fertile cause of sickness here, and that under the present system it was unavoidable in very many instances.

NOTES OF CASES.

W. S. Jackson, landsman, admitted December 14, 1873, with cerebro-spinal meningitis. Has been very sea-sick. Last

night, though provided with a hammock and put into it, he slept on the wet deck. Is very lethargic; will not answer questions; refers by signs to the back of his head and neck as the seat of pain. Pulse full, slightly increasing in frequency; excreta have been normal. Temperature at 6 p. m., 105°. 15.—Active delirium through the night. Condition of yesterday persists with additional marked symptoms. Is very restless, movements spasmodic in character. Lower limbs flexed. Tendency to opisthotonos. Pulse 92; weak. Temperature 101°. Excreta normal.* At times jaw is fixed spasmodically; this condition induced by attempts to administer medicine or nourishment. Emp. cantharid. to the back of the neck. ℞. Potassii bromid., 3 ss; repeat p. r. n. Essence of beef. 16.—Nervous symptoms abating; head still thrown back; no freedom of motion. Pressure on back, especially in cervical region, occasions great pain. More rational. Pulse 98. Temperature 101°. Continue bromide and nourishment. 20.—Has been slowly convalescing. Has had continuous severe headache, which is becoming less. Has been lethargic, is not disposed to talk, and keeps his head thrown back. Decided improvement in general condition. Bowels confined. Ordered laxative. 23.—Doing well in all respects. January 18, 1874.—Discharged to duty. Gained strength slowly, but has had no increase of nervous symptoms, of which immobility of the neck was the most persistent.

Jackson, previously to his enlistment, lived in New York City, and his disease undoubtedly originated there.

John Kernan, seaman, admitted December 28, 1873, as with continued fever. No symptom or sign of grave disease noted; complained only of slight headache. Ordered laxative and rest in bed. 29.—Yesterday afternoon was found sleeping on the wet deck. During the night became delirious, and symp-

toms of cerebro-spinal meningitis have been rapidly developed. Has trismus, rigidity of the neck, spasmodic movements of extremities, sensitiveness to the touch over spine,—particularly in cervical region. Throws himself about with great violence, which prevents the possibility of observation of pulse and temperature. Treatment.—Potassii bromid., chloral hydrat., and counter-irritation to the back of the neck. 30.—Entirely unconscious; no abatement of symptoms. Transferred to the United States Marine Hospital at Key West. January 2, 1874.—Died.

Sectio cadaveris eighteen hours after death.

General appearance.—Eyes sunken, with dark rings. Hypostatic spots along dependent side of body. Remains of a blister upon the back of the neck. Several herpetic spots upon lips. Rigor mortis normal.

Brain.—Pia mater intensely congested; sulci filled with puruloid lymph; sinuses filled with black blood. The entire surface of the brain, superiorly and inferiorly, covered with the puruloid deposit, extending into the fissures; thickest about the crura. Upon section the white substance appeared normal and firm. The ventricles were filled with an opaque fluid, containing free masses of lymph, the fifth ventricle being markedly distended, and the roots of the cranial nerves surrounded by lymph. The corpora striata and the optic thalami were very much congested, the blood exuding from the severed brain-vessels.

Spinal cord.—Cerebro-spinal fluid opaque. Posterior surface of cord completely covered with a layer of puruloid lymph, which, in the central portions, was more than two lines in thickness. For a space of about five inches in the central region of the cord was a thin layer of effused blood. On anterior surface, superiorly, the lymph was found scattered at various intervals, increasing in quantity toward the cauda equina, where the surface was completely covered, though not so thickly as

posteriorly. Upon section of the cord the anterior column, where the brachial plexus originates, was found much congested.

There was posterior hypostatic congestion of the lungs. The heart and abdominal viscera were normal.

Notes of the autopsy in the above case were furnished me through the courtesy of Dr. Murray, surgeon in charge of the Marine Hospital at Key West.

Henry Neale, landsman, cerebro-spinal meningitis. December 28, 1873.—Admitted as with febris intermittens. January 1, 1874.—Doing well up to last night, when he was suddenly attacked with pain in the head and back of the neck. This morning he has tendency to opisthotonos, throwing his head back, and maintaining it rigidly in that position. No delirium; no spasm; very lethargic; circulation much depressed; great pain in back of head; extremities cool. Treatment: Cathartics, counter-irritant to the back of the neck, and potass. bromid. 9.—Condition had slowly improved; no nervous symptom remaining, except position of head and immobility of neck; appetite good, and had gained strength. Yesterday afternoon he was found to be very weak; pulse frequent and small; tongue brown and dry—typhoidal. Ordered stimulants and meat-juice. Transferred to United States steamer Pawnee. 13.—Transferred, by order of the admiral, to Marine Hospital, where he was received in a very weak state. February 11.—Discharged to duty.

In this case convalescence was very slow. The symptoms of cerebro-spinal disease were less marked than in the other cases, but sufficiently characteristic. The man is of very feeble intellect, and has been reported, on several occasions, as addicted to self-abuse.

Dr. Murray had no doubt of the nature of the case.

James Roach, landsman, cerebro-spinal meningitis. January 4.—Admitted with tonsillitis. 7.—Yesterday was nearly well.

This morning, while standing at the table, having just said that he was well enough for duty, he suddenly fell; circulation much depressed; spasmodic movements of limbs; pain in head and back of neck; extremities cold. Stimulation and application of heat to extremities and surface produced reaction and some amelioration of symptoms. Was transferred to the United States Marine Hospital. The diagnosis was confirmed by Dr. Murray, and symptoms characteristic of cerebro-spinal meningitis were developed February 21.

This case progressed favorably, but after convalescence was thoroughly established (he was, in fact, nearly well) he had a relapse, which seemed likely to terminate fatally. Roach is still at the hospital, at last accounts slowly gaining strength.

William Cusack, quartermaster, cerebro-spinal meningitis. January 19.—Admitted. While on watch fell in violent convulsions; spasmodic movements of extremities; opisthotonos, &c.; remained unconscious about fifteen minutes. After regaining his consciousness he suffered from severe abdominal pain, and subsequently from pain in back of head and neck. He was at once transferred to the Marine Hospital. February 1.—Discharged to duty.

Dr. Murray states that the diagnosis was confirmed by subsequent symptoms—recurrence of convulsions, &c.

Joseph Williams, cabin-boy, cerebro-spinal meningitis. January 19, 1874.—Admitted. Was suddenly attacked yesterday with abdominal pain and prostration. Relieved by sinapisms and stimulants. 20.—No acute pain; abdomen very sensitive to the touch; pain in head and neck; lethargic; unwilling to speak, but can be aroused; circulation much depressed. Transferred at once to the Marine Hospital. 28.—Discharged to duty.

Dr. Murray states that in this case various symptoms of cerebro-spinal disease were developed—convulsions, &c. Convalescence was very rapid.

Case of Midshipman R. D. Stevens, remittent fever. January 2.—Admitted as with intermittent fever. For several days had been complaining to his messmates of not being well, but expressing great unwillingness to go on the sick list. Appearance cachectic, and indicative of very delicate health. This afternoon he stated to the medical officer on duty that he had had a chill; that he had had several previously; he complained of constipation and headache. At the time had no fever. Laxative pills, to be followed by Seidlitz powder in the morning, were ordered. Rest in bed. 3.—Seen at 4 a. m. Said that he had passed the night comfortably, but had severe headache. At about 7 a. m. talked with a messmate, saying that his headache was worse. At 8 a. m. found to be nearly unconscious; circulation much depressed; head hot; extremities cold; very restless; pressing his hands on his head. Every effort made to equalize the circulation. Pulse increased in force and frequency somewhat; head became cooler and extremities warmer, but there was no abatement in the symptoms of cerebral congestion. 4.—No material change in condition; cerebral symptoms unabated; patient nearly unconscious to external impressions; will suck a little water from a sponge; pulse 100, and weak; temperature 100°. Through the day there were at times slight indications of returning consciousness noticeable as the circulation became in a measure equalized by applications of cold and heat. In the afternoon he swallowed a little essence of beef, and sucked some milk from a sponge. Partial return of consciousness manifested by pressing the hand of a friend, but there was no attempt to articulate; soon became entirely unconscious and unable to swallow. Prognosis most unfavorable. 5.—Pulse 140; temperature 103°; complete unconsciousness; evidently failing rapidly. Nourishing and stimulating enemata were administered, but with no effect. Comatose. Died at 5.45 p. m.

Mr. Stevens had contracted Chagres fever while attached to the United States steamer Kansas during the summer of 1873. In the autumn of that year he was much prostrated by a return of fever. It is evident that his health had not been re-established when he joined this vessel. Hard work, boat-duty, cold and dampness of the ship, were the exciting causes of his relapse.

The unusual gravity and persistence of the cerebral symptoms of the congestion that occasioned death are explained by the accidental discovery of a firm coagulum which plugged the right jugular vein near the heart. This was found by Dr. Murray, of the Marine Hospital, and seen by Dr. Porter, late United States Army, who were present when the body was prepared for transportation. The coagulum extended from two inches above the clavicle downward toward the heart, and was so firmly fixed that it could not be extracted.

Very respectfully, &c.,

S. F. COUES,
Medical Inspector, U. S. Navy.

Surgeon of the fleet F. W. GUNNELL,
U. S. Navy.

REPORT OF A. L. GIHON, M. D.,

Medical Inspector U. S. Navy.

U. S. S. FRANKLIN.

HYGIENE.

Complement of officers and men, 630. Cubic air-space of gun-deck, 60,000 feet. Number of men sleeping on gun-deck, 350; cubic air-space for each man, 170 feet. Cubic air-space of berth-

deck, 35,000 feet. Number of men sleeping on berth-deck, 200; cubic air-space for each man, 175 feet. Cubic air-space of forward officers' rooms, 200 feet; of rooms on orlop, 150; of ward-room state-rooms, 225; of steerage, 1,280; of sick-bay, 3,000. Percentage of sickness of complement, 43; of mortality, 0.

General hygienic considerations and suggestions.—The large sick-lists, which were the rule on this in common with all other newly-recruited ships upon this station, and which almost totally disabled them for the first six weeks of their commission, were unmistakably the results, both of causes peculiar to the ships, and of others of external origin. Prominent among the first were foul bilges, unclean holds, defective fittings of ports, &c., for which the navy-yard officials were responsible; and, worse than all in its effects upon the health of the crew, there was on board this ship and the Colorado a most reprehensible system of discharging the noisome odors of the bilges through numerous large iron perforated plates, opening on both sides of the berth-deck, in the sick-bay, cells, store-rooms, and state-rooms under each officer's bunk, a fault of construction for which no pretext can possibly be suggested.

The extrinsic causes of the unhealthfulness of the newly-commissioned vessels were principally the injudicious system of enlisting large numbers of inexperienced and inefficient landsmen, unused to the peculiar conditions of life on ship-board and unfitted to endure the arduous labors immediately required of them and the necessary exposure to the inclemencies of a severe winter, while they were insufficiently clad, many of them not provided with bedding and unable to eat the Navy ration, or to cope with their hardier comrades who stole their share of food, as they had already rifled their scantily-supplied clothing-bags. The complement of this vessel actually included two hundred and seventy-nine landsmen and boys who had never before been to sea.

The receiving-ship is presumed to supply a body of exceptionally healthy men for the crew of the vessel going into commission; but it is the fact that the dispensary and sick-bay are thronged as soon as the flag is hoisted. Many instances have come to my knowledge where recruits brought from the north have at once repaired to the sick-bay to await a survey and been returned as invalids by the very steamer which had brought them as recruits. I have appended a tabular exhibit of the most conspicuous cases of improper enlistment on board this ship, comprising (1) old men over sixty years of age, crippled by rheumatism, with defective vision and hearing; (2) feeble, ill-developed, runaway boys; (3) idle, ignorant, dissipated, and cachectic landsmen, some with well-marked cardiac affections; (4) cases of unsound mind; and (5) of men disabled by long-standing surgical injuries. However importunate the old sailor may be for re-enlistment, and many of these are ex-beneficiaries from the Naval Asylum, who have deserted or been discharged for misconduct, experience proves that they invariably become subjects for survey and invaliding. The manifest signs of constitutional dyscrasy, venereal cachexia, faulty development, obtuse intellect, and prior sedentary occupation equally disqualify the young applicant for enlistment; while no rule should be more absolute than that rejecting any man who has had fracture or luxation with permanent impairment of the motions of an articulation, conspicuous deformity, a feebleness or retarded development of a limb, since exposure to wet and cold, arduous labor, or otherwise trifling accidents, will either aggravate the abnormal condition of parts or furnish a pretense for evading duty.

Independently of other disqualifications, I am of opinion that the system of filling ships with unskilled landsmen, who soon become sea-sick and home-sick, deceived as to the nature of their duties or incapable, from lack of aptitude, of adapting them-

selves to them, is detrimental to the discipline and efficiency of the service. A smaller number of ordinary seamen, whose previous experience on shipboard had accustomed them to the motion of the vessel, the restricted space, the interruption of sleep, and the peculiar food, would more than counterbalance the higher wages on the one hand, and, through their less liability to sickness, the diminished complement on the other, for a habitually large sick-list reduces the efficiency of a crew far more than the mere deficit of as many men. The great need of the Navy is undeniably a school for seamen in the shape of training-ships at all the principal sea-ports, where recruits (and, in this event, the objections to the enlistment of landsmen will not exist to the same degree) can be thoroughly instructed in the duties peculiar to a man-of-war, and those unfitted for the naval service by disposition, inaptitude, or infirmity discovered and weeded out. I have been assured by officers of receiving-ships that it is not uncommon to empty the sick-bay and get rid of worthless and troublesome men by drafting them to sea-going vessels, while the extortions to which the recruit is exposed from persons permanently filling subordinate positions on board these ships demoralize him and inculcate the belief that during his whole career he is to be the victim of oppression and fraud.

I believe it would also contribute to the efficiency of the service were quarterly reports to be made by commanding officers of men disqualified for the Navy by causes other than positive sickness, such as stupidity, inaptitude, moral turpitude, incorrigible slovenliness or uncleanliness, &c., with the object of ridding the service of individuals unable to receive instruction, and who by remaining on board ship only injure discipline by their vicious example and actual incumbrance.

Even more urgently important is the matter of the outfit of clothing and bedding, which should be gratuitously supplied

by the Government, that the recruit may not have the discouraging weight of a debt of $70 or $80 upon him for the first half-year of his cruise, confining him to the ship as in a prison all this time, with its consequent inducement to desert.

These changes, with permanent advancement to non-commissioned grades, accompanied with greater privileges, distinctions, and responsibilities, with frequent liberty on shore, conditional upon good behavior, and the payment of half their monthly pay, or, where they have no families nor dependents, of their entire wages, will undoubtedly result in the growth of a class of men-of-war's men attached to the service for its own sake, and who will regard their connection with it as their life-long vocation.

A more strict observance of the requirements of paragraph 166, "Regulations for the Government of the United States Navy," will obviate much of the confusion and irregularity that now characterize descriptive lists, pay-rolls, and medical journals. In some instances the identity of the individual is only to be traced by a faint resemblance in sound, as where Cannon has become Cameron, Zimmerman Cinerman, Detlefts Deftless, &c. I would suggest that the name on the original certificate of physical examination (Form Q) be that which should be rigidly adhered to, and that the medical examiner filling said form be required to exercise the utmost care in obtaining the correct name of the recruit, no man totally ignorant of the English language being ever accepted for general service.

The unclean personal habits of recruits are often due to ignorance, and part of their preliminary training should be how to keep themselves and clothing clean. On board sea-going ships men suspected of being unclean should be sent to the sick-bay for more thorough examination than is possible at divisional inspections. The propeller-well of this ship has been advantageously used as a bathing-place, swimming being dan-

gerous on account of sharks. On board the Canandaigua the custom of supplying men with distilled water for ablution has been established with satisfactory results.

Insufficient food has been included with other causes of sickness among recruits. The naval ration exhibits the full amount of material required for the healthy maintenance of the body, but recruits are seldom able to eat the meat, and subsist principally on bread, the whole ration of which, (14 ounces,) since the morning issue of coffee, has been found insufficient, and should be augmented to 20. Paragraph 558, "Regulations for the Government of the United States Navy," authorizes the messes "to relinquish one complete ration in a mess of eight, and two in messes of not less than fourteen persons;" and this is the maximum reduction which, under any circumstances, ought to be tolerated; but a regulation of the Bureau of Provisions and Clothing, dated June 1, 1872, allows the stoppage of two rations in ten. The evil of this regulation is less apparent in foreign ports, where bumboat supplies are cheap and men have larger allowances of liberty-money, and old sailors, with the interested connivance of berth-deck cooks, easily induce their inexperienced messmates to agree to a similar stoppage in the outset of the cruise. Recruits are thus deprived of the food they absolutely require to the extent of one-fifth the amount of the established ration; the item bread, of which they have especial need, being reduced to $11\frac{1}{5}$ ounces, about half of what has been suggested as a regular daily issue. I ask the attention of the Bureau to the necessity for the rescindment of this regulation. The recent addition of dried onions and tomatoes to the ration cannot fail to be of general benefit.

I have also to call attention to the fact that the food of the sailor is seldom properly cooked. Ship's cooks should be carefully examined as to their qualification for their important duties. I would also suggest, as a regular part of the instruc-

tion on board training-ships, that men be taught the duties of berth-deck cooks, especially the preparation of tea, coffee, and scouses, making bread, puddings, &c., and that the system of "steady" or permanent berth-deck cooks be dispensed with.

The distiller in use on board this vessel is capable of supplying 2,000 gallons daily, but from some defect of the apparatus the water is frequently unpalatable, and is believed to have been the cause of gastric and intestinal derangements.

Ventilation is provided for on board this ship by the customary wind-sails and permanent ventilators. The latter, especially those opening into the sick-bay, are too low to be of any service. With the wind ahead or on the bows these sick-bay ventilators only serve to render its atmosphere insufferable from the stench carried into it from the head. The air-space of the berth-deck is needlessly encroached upon by bulk-heads inclosing a space 70 feet long over the engine-room, preventing any communication or passage of air between the two sides of the deck for that distance. Officers' store-rooms and other apartments not used for habitation further interfere with the air-space, and by occluding a large number of ports materially diminish the supply of fresh air. The officers who have quarters on the orlop-deck should be accommodated on the berth-deck. I would suggest, before this ship is again commissioned, an entire re-arrangement of this deck and that below it.

Admiral Porter has advocated, in his recent report to the Secretary of the Navy, the removal of the sick-bay to the gun-deck. Its present location, on the extreme forward end of the berth-deck, is manifestly unsuited for its purposes, but I have come to the opinion that the sick-bay or hospital, (a preferable name,) as a partitioned apartment, might, very advantageously, be altogether dispensed with. When serious cases require treatment, it is now the established custom to remove them to the gun-deck, and this practice should be continued. Thin reed

or cane screens or blinds should be suspended around the cots to shield them from observation. All cases, except those actually bedridden, should be compelled to remain during pleasant weather on the spar-deck, exposed to air and light. The practice of allowing every man excused from duty to loiter the whole day in the sick-bay is one to be deprecated, and is actually prejudicial to the proper treatment and speedy recovery of most cases. The dispensary should be very much enlarged to serve the additional purpose of a prescribing and examining room, as well as a proper office for the preparation of medical returns. The present location of many dispensaries, as on board this ship, with coal-chutes running through them, is highly objectionable, on account of the soiling of apparatus and interference with duty. An additional chute here also passes through the medical store-room, requiring the removal of a large portion of the contents of the latter while coal is being taken on board.

I have further to recommend, in the strongest terms, the return to the practice of covering the berth-deck with shellac. The effect of merely painting the berth-deck of this ship, (shellac was not obtainable,) and cleaning it by means of hot water and cloths, and of wetting the gun-deck but once a week, was shown in the very marked improvement in the health of the crew. After this had been done, the bilges being also scraped every week, washed with solution of lead nitrate and coated with carbolated lime, and the bilge-vents on the berth-deck closed, the sick-list fell from 50 off duty, with 70 to 80 daily under treatment while doing partial duty, to a minimum of 4, and for many weeks seldom exceeded 8 or 9. The issue of fresh food, and the requirement of the men to remain on deck as much as possible in the open air and light, have also contributed their share to the excellent hygiene which, despite the disadvantages of *personnel*, equipment, and climate, has recently characterized this ship. Similar results have obtained on board the Col-

orado, whose sanitary history has been almost identical with that of this ship, except that the still greater intensity of morbific influences there induced the development of a number of cases of cerebro-spinal meningitis. The experience of these two vessels alone establishes the fact that no immediate reform in our naval economy is more imperatively demanded than that requiring navy-yard officials to transfer all sea-going vessels completely equipped and perfectly clean. The gain of time in sending a crew on board before this is done is more than counterbalanced by the demoralization, disease, and temporary inefficiency which are now the rule.

Record of cases unfitted for duty by causes existing prior to enlistment.

Name.	Rate.	Age.	When enlisted.	Nature of disabilities.
Elijah Henry Smith	Wardroom-steward	60	Boston, December 6, 1873	*Adynamia senilis*—a decrepit negro, who came to the sick-list a few days after joining the ship, affected with chronic bronchitis, crippled by rheumatism and infirmities of old age.
William Wright	Chief boatsman's mate	63	Boston, December 16, 1873	*Adynamia senilis*—chronic rheumatism, chronic bronchitis, impaired vision, defective hearing; has been an inmate of the United States Naval Asylum.
John Henry Thompson	Quartermaster	62	Boston, May 10, 1873	*Adynamia senilis*—chronic rheumatism, old luxation of the left tarsus, for which he was sent out of the United States steamer Ohio in 1872 by Passed Assistant Surgeon Dearborne.
Charles William Locke	First-class boy	18	Boston, November 22, 1873	*Adynamia*—a feeble, overgrown boy, totally unable to perform his duty.
John Eastern	Landsman	19	New Orleans, November 27, 1873	*Adynamia*—a feeble, ill-developed, runaway boy, with old cicatrices on legs, &c.
Charles Crump	do	21	Boston, November 29, 1873	*Adynamia*—a feeble, emaciated, negro lad.
Heman Heidman	Seaman	19	New York, December 5, 1873	*Syphilis consecutiva*—indurated lymphatic glandula; 22 months' duration.
Augustus Pettingill	do	20	New York, December 1, 1873	*Adynamia*—a pale, delicate boy, who shipped "to gain health."
James Turner	Landsman	21	Boston, December 17, 1873	*Adynamia*—a feeble, miserable boy, unfit for any duty whatever.
David Foreman	do	21	Boston, December 3, 1873	*Adynamia*—a weak, attenuated, ill-developed negro.
Anthony Berg	do	21	New Orleans, November 24, 1873	*Adynamia*—a feeble, ill-developed, runaway boy.
George Bradford	Ordinary seaman, extra	23	Boston, November 24, 1873	*Bronchitis chronica*—had been discharged by recommendation of medical survey October 13, 1873.
Andrew Smith Dow	do	22	Portsmouth, N. H., December 2, 1873	*Rheumatismus chronicus*—suffered so much prior to enlistment that he could get no employment.
John Elms	Landsman	26	Boston, December 5, 1873	*Palpitatio cardis*—while brakesman on Erie Railroad jammed between two cars, August, 1873.
Joseph Junior Gilbert	do	27	Boston, December 4, 1873	*Adynamia*—feeble, emaciated, worthless.
Henry Clark	do	24	do	*Palpitatio cardis*—marked; unable to work a whole year prior to enlistment.
Jason Henry Richmond	do	25	Boston, December 6, 1874	*Spermatorrhœa* from excessive masturbation; very weak; habit of long standing.
William Rushworth	Machinist	28	Boston, November 28, 1873	*Dementia*—discovered to be of unsound mind as soon as he joined the ship.

Record of cases unfitted for duty by causes existing prior to enlistment. Continued.

Name.	Rate.	Age.	When enlisted.	Nature of disabilities.
David Loveland	Landsman	27	Boston, December 9, 1871	*Dementia*—feeble intellect, incapable of performing any duty, intelligent.
John Sullivan	do	20	Boston, December 11, 1871	*Dementia*—weakness of intellect; remarked when he first joined the ship.
John Detlefts	Seaman	31	New York, December 4, 1871	*Dementia*—manifest, at moment mind when he came aboard; recent, unmanageable.
Sydney Silver	First class boy	17	Boston, December 4, 1871	*Dementia*—of low order of intellect; sometimes violent. Harvey W. Lancaster, landsman, has known him from childhood in Bangor, Me., and testifies to his being "crazy."
Peter O'Brien	Landsman	21	Boston, November 17, 1871	*Varix*—varicose veins of both legs, evidently ancient.
Jerome Kelly	do	21	Boston, December 4, 1871	*Hernia abdominal*—right side of median line; result of blow received 11 years ago.
Milford Wellington Oxley	Barber	21	Boston, December 14, 1871	*Perlunitis chronic*—of upper extremity of left tibia, the consequence of an injury received several years ago, the cicatrix of which is conspicuous; the shaft of the bone very much enlarged and very irregular.
August Lister	Landsman	32	Boston, December 9, 1871	*Cicatrices retracted*—deformity of right hand (with permanent contraction of first, second, and partially of third, fingers) from wound received six months ago in a trunk factory. Unable to close the hand sufficiently to grasp a rope.
Patrick Collins	....do....	22	Boston, December 13, 1871.	*Vulnus incisum*—long cicatrix of wound of right wrist, received several months ago; caused by piece of broken glass; severed ulnar artery and nerves; thumb retracted and shortened; loss of sensibility of index and middle fingers; the whole hand considerably smaller than the left, and permanently weakened.
Thomas Williams	Seaman	31	New York, December 2, 1871	*Luxatio*—old dislocation of right wrist, with great deformity, impeded movements of the joint, and weakness of limb; received injury in 1865.
Peter Norris	....do....	35	New York, December 20, 1872	*Luxatio*—old dislocation of right wrist, with deformity, loss of strength of hand, &c., received in merchant-service five years ago.
John Nann	Landsman	31	Boston, November 24, 1873	*Vulnus sclopet.*—gunshot-wound of right leg, indicated by extensive cicatrices, very sensitive and

				intolerant of pressure, received while a private in Army; discharged from United States Army "with disability" June 28, 1870. His injuries necessitated operation of ligation of the femoral artery, the long cicatrix of which is prominent and painful; cannot remain long upon his feet, and is unable to go aloft.
James Purr	Private marine	28	Portsmouth, N. H., October 18, 1873	*Fractura*—of right elbow, with permanent flexion of fore-arm and partial paralysis; the limb having been shattered by the premature discharge of a IX shell from a gun in 1862, while he was in the British service; had been under treatment several years, and is now the recipient of a pension of one shilling per day from the British government; admits that he enlisted because unable to obtain other employment.
Thomas Clow	Ordinary seaman	21	Boston, November 26, 1873	*Fractura*—of skull above left ear, received in winter of 1872 on board merchant-ship, and plainly indicated by large, broad cicatrix and depression; was under treatment about nine months in the Marine Hospital, Chelsea, and shipped soon after being discharged. He was found with an epileptic fit, and on previous occasion had fallen through a hatchway and into chain-locker, while probably unconscious from "petit mal;" has chronic purulent discharge from left ear.
Frank Benton Farmer	Landsman	22	Boston, November 25, 1873	*Fractura*—right elbow; fell from horse four years ago; deformity and impeded motion.
Edward Herbert Scott	do	20	Boston, November 24, 1873	*Fractura*—right thigh, with shortening of limb and inability to kneel without eversion of the entire extremity.
Stephen Hickey	do	21	Boston, December 8, 1873	*Fractura*—left elbow, with great deformity, shortening of the arm, and interference with the normal motions of the joint.
John Dailey	do	21	do	*Fractura*—of the skull, result of an injury while a child; conspicuous depression of the median line; very low order of intellect.
William Henry Graham	do	21	Boston, December 12, 1873	*Fractura*—inferior extremity of left radius, with partial luxation of left wrist; deformity and weakness of the joint.
Edward Welch	Ordinary seaman	35	Cleveland, December 1, 1873	*Fractura*—of both bones of right leg above the ankle; injury received while working as laborer at the Southwest Pass three years ago; marked deformity; the leg smaller than its fellow; painful when attempting to go aloft.

Report of Newton L. Bates, M. D.,

Surgeon U. S. Navy.

U. S. S. Brooklyn.

Hygiene.

The Brooklyn was put in commission January 20, 1874, with a full complement of 390 officers and men. The weather was cold, wet, and disagreeable. So far as practicable, the ship was prepared for the reception of the crew by scraping and holystoning. Steam also had been kept up in the deck-heaters for a week or more, and the ship was tolerably warm and dry. The crew contained a very large proportion of landsmen, who had been hurriedly enlisted at inland stations, without reference to previous sea-experience. Even the seamen had been, for the greater part, recruited from the merchant-service, so that the shaking down into a state of discipline and comfort was attended with unusual difficulties. In a few days after receiving the crew we were at sea in a gale of wind, but owing to the precautions taken not a single case of pneumonia or other disease, resulting from exposure, was caused by going into commission at a northern port in midwinter. On the passage to Key West a thorough examination was made as to vaccination, and nearly 300 men were vaccinated. Owing to the number vaccinated, and the amount of work necessary at the time, an attempt to collect results was a failure, but sufficient information was collected to show that the vaccination was fairly successful. In the first few months of the cruise cases of improper enlistment occasionally came forward, and were sent north for discharge. My experience, however, was more favorable than that of surgeons of some of the other vessels, and most of my cases of men unfit for the service would have passed an ordinary physical examination.

The first four months of the cruise the Brooklyn was almost constantly under steam, and the work was severe in a hot and trying climate. The result was that after a cruise among the Windward Islands, with liberty granted at Guadeloupe and Barbados, several cases of remittent fever, with grave typhoid symptoms, occurred, and one man died at Trinidad on the 26th May.

The adynamic character of disease at this time induced me to advise the commanding officer to put to sea and suspend exercises so far as possible. This was done with prompt and decided benefit to the general sanitary condition of the ship. I may state here that liberty at Point-a-Pitri and Barbados was unusually free from its common sequelæ, syphilis and gonorrhea.

The month of August, at Key West, was continuously hot, with frequent rains, and but for the fact that stringent sanitary and quarantine regulations were well enforced, I believe that the health of the large squadron stationed at that point would have suffered greatly.

The cases of illness on the Brooklyn were not numerous, but an unusually large proportion were sent north, with no prospect of recovery in a climate like that of Key West.

The ship made a pleasant passage to Norfolk in October, and to the end of the year the sanitary condition was good and without incident.

The Brooklyn berths her crew remarkably well, and is very well ventilated by hatches and wind-sails. The drinking-water, distilled by ordinary coil-condensers, is free from salts, and unusually good. The sick-bay, crowded forward on the berth-deck, is badly ventilated and without sufficient light. A hatch to be cut through from the spar-deck will, however, improve it so far as is practicable without removing it to some other part of the ship.

I strongly recommend the erection of a cheap hospital at Key

West for the use of yellow-fever patients. A rough, wooden building, unplastered, to accommodate twenty beds, is, I think, sufficient. It need not be kept open, but all beds and furniture stored in the store-house until wanted, when in a few hours colored nurses and a cook could be hired and the hospital put in operation. The expense of erecting and equiping a suitable building would not cost more than $5,000. It would be much cheaper to pay even more than this amount than to keep a ship like the Pawnee in commission. It would lessen the risk of conveying the disease to cruising-ships on the station.

Report of Wm. B. Davis, M. D.,

Assistant Surgeon U. S. Navy.

U. S. Monitor Saugus.

HYGIENE.

Complement of officers and men, 93. Cubic air-space per man on shipboard, 400 feet. Percentage of sickness, .5.; of mortality, .005.

Ventilation.—In port the ventilation is all that could be desired, as there are five ventilators and a large hatch opening into the cabin, ten ventilators and a hatch into the wardroom, three into the steerage, and a large hatch and sixteen ventilators into the berth-deck. In the fire-room there is a large hatch and a ventilator, the latter being the only one kept open at sea, as it extends up above the smoke-stack.

At sea the ventilation is very poor, as it consists entirely of what is supplied by two blower-engines, the flues from which open in the floor of each room, and in the cabin and berth-deck.

The only effect the blowers seem to produce is to stir up the foul air, and, consequently, not much benefit is derived from them. The *defect* is in the supposition that the blowers will be supplied with fresh air through the lattice-work floor of the turret, while the fact is that at sea, which is the only time the blowers are needed, the floor of the turret is covered by a tarpaulin, to prevent seas which break over the turret from getting into the ship itself, and this tarpaulin, of course, prevents the admission of air. The *remedy* would consist in the unobstructed admission of fresh air to the blowers, which could be obtained by pipes leading from the ventilator in the fire-room to the blower-engines, which are in the turret chamber, just below the guns.

Lighting.—In port the only light is derived from the hatches, as but little is obtained from the ventilators, and consequently we have to rely in a great measure upon artificial light. At sea, on the contrary, there is an abundance of light, for the awnings are all down, the ventilators off, and glass dead-lights put in their place. The hatches also are closed by iron plates studded with glass bull's-eyes.

Warming.—There are steam-heaters placed at various intervals in the ship, but owing to the mild climate there has been no occasion to use them.

Water.—We use distilled water entirely on board the ship, as that in the Government cisterns ashore is strongly impregnated with chloride of sodium, partly due to the leaks in the pipes in the condenser, and partly to the spray from the sea, which fills the air whenever there is a gale.

The total capacity of our tanks, four in number, is 2,600 gallons, and we can condense 1,200 gallons per day, thus being able to fill them in a little over two days. The daily consumption is 150 gallons.

Food consists of Navy rations; fresh beef three times a

week—when obtainable—and fresh vegetables, (potatoes and onions.)

Clothing.—That issued to the Navy.

General hygienic considerations.—I would most earnestly recommend that this ship be sent north in the spring, and remain there at least one winter, for although every precaution was taken to disinfect her after the epidemic of yellow fever on board during the past fall, experience has shown that the disease invariably re-appears in the summer if the ship is allowed to remain in the same climate.

MEDICAL TOPOGRAPHY.

Key West, where this ship has been for the past year, is an island about six miles long and one and one-half wide, (at its broadest part.) There is a considerable amount of marsh-land on the island, and several stagnant pools of considerable size. During the summer and fall the prevailing diseases are remittent and intermittent fever, and occasionally an epidemic of yellow fever with now and then a sporadic case of typhoid. There is also at all seasons of the year a great deal of asthma among the native population. The percentage of sickness on the island could be greatly diminished by the town authorities taking proper precautions with regard to drainage and the removal of garbage. There is a marine hospital here; also a medical society, but it is not prosperous and has contributed nothing to the advancement of medical science. There is no medical college in the State of Florida.

Report of J. C. Boyd, M. D.,

Assistant Surgeon U. S. Navy.

U. S. S. Fortune.

Vera Cruz, Mexico.

The city of Vera Cruz, situated in a low and marshy plain, and surrounded by large sand-hills, the result of frequent northers, offers every attraction for disease. The soil is a dark loam. Immediately on the water's edge there is an abundance of coral limestone, very much employed in the construction of buildings. As we proceed inland sandstone and marl are found.

The climate of Vera Cruz is agreeable, having a mean temperature throughout the year of 80° Fahr. The hottest month is July, with the thermometer at 95°, and the coldest January, with a temperature of 65° Fahr. During the dry season the temperature is well borne. With the advent of the rainy period, however, the atmosphere becomes moist, heavy, and very oppressive.

The winds are generally from the northeast, blowing very steadily.

Sanitary arrangements.—Water-supply: Until very recently, 1867, Vera Cruz has suffered much from a deficient water-supply, depending exclusively on tank and cistern water for drinking-purposes, using well-water for washing, &c.

With the introduction of a more wholesome and better supply of water, the health of the city has notably improved, shown by a smaller percentage of sick and a lessened mortality. Indeed, there are many who believe that to it can be attributed the mitigated form of yellow fever which has prevailed in Vera Cruz for the past few years. Water is now brought to the city, by means of steam force-pumps, from the Jamapa River, fifteen miles southwest of it, and is carried through iron pipes. The

principal pipe is 2½ feet in diameter. Smaller pipes convey the water through the principal streets, and from these are small tubes opening into each house. Every house is provided with a large reservoir on the ground-floor, and from this the water is conveyed by hand to various parts of the house.

The drains are wholly on the surface, occupying the middle of each street, 1 foot in width and 2 inches deep. Underground drainage is impossible, owing to the low situation of the city and the water-level being within 2 feet of the surface. As constructed, they are only streams of dirt and filth. To obviate their stoppage by solid matter, there are situated at the heads of the principal streets steam-pumps which wash them out thoroughly every night. The house-drains are merely small channels conveying into the central drain the house-washings and the contents of the urinals.

Cess-pools are still used here, little or no attention being paid to the removal of their contents. To the filthy condition of its sewers and drains can be attributed the severe epidemics of yellow fever which have desolated the city for years past; and, until hygienic measures are instituted, it will continue to act as a focus for epidemic diseases.

Diseases.—The principal diseases are: 1. Yellow fever; 2. Catarrhal affections; 3. Phthisis pulmonalis; 4. Paroxysmal fevers; 5. Dysentery; 6. Ophthalmia.

Paroxysmal fevers are frequent, occurring generally during the dry season, and assuming, as a rule, the tertian type. A characteristic feature of intermittent fever is that the intermissions or paroxysms are never well pronounced, but run gradually into each other, thus resembling remittent fever. Phthisis pulmonalis is a common affection, and the moist and humid atmosphere tends to favor its rapid development. Owing to the elevation of the city of Mexico, and its bracing climate, a case of phthisis is rarely seen. During the season of the "north-

ers" the atmosphere of Vera Cruz is filled with fine particles of sand and dust, which, being constantly inhaled, give rise to much irritation and inflammation of the pulmonary tissue, and perhaps act as the exciting cause in many cases of latent phthisis, which otherwise would have remained undeveloped. Of late years the yellow-fever epidemics have lost their former malignancy, which may be accounted for by the introduction of pure water and a closer attention to hygienic measures.

HOSPITALS.

With hospitals and charitable institutions, Vera Cruz is abundantly provided. From the sickly character of the city it was found necessary to establish some building for the care of the sick very soon after the conquest; and, in 1579, the hospital of San Sebastian was founded by the viceroy, Don Martin Enriquez de Almanza, on the same island with the fortress of San Juan de Ulloa. Afterward, seeing the inconveniences of establishing the hospital on the island, the distance from the city, and the sufferings of the sick consequent on their removal, it was transferred to Vera Cruz; and, after many changes, it was finally established, in 1845, in the old convent of the Belemite Fathers. This is a large two-storied building in the most elevated portion of the city, and having its westerly face bordering on the ocean. It consists of six large wards: two surgical, two medical, one for convalescents, and one for prisoners. There are also four rooms for treating persons of distinction. The number of beds is two hundred and fifty-eight, which, in cases of emergency, can be doubled.

The wards are large and airy, holding forty-two beds each, and allowing a capacity of 2,200 cubic feet for each patient. Ventilation is carried on by natural methods, there being large windows placed between every two beds. The ground-floor of

the building is not used for wards, but is occupied by store-rooms, kitchen, lavatory, dissecting-room, and operating-room.

There are no means for warming the hospital. Artificial heat is rarely found necessary in this climate. Lighting is done by means of gas. The same difficulty is met with here as in the private dwellings, viz, that there are no means by which the water can be conveyed throughout the building. The privies are filthy and unclean, a large and deep well acting as the receptacle for urine and fecal matter, which is seldom emptied. The beds are all iron, having a sheet of canvas stretched across them, which fulfills the purposes of a mattress. The floors are kept either oiled or waxed.

Its dispensary, store-rooms, operating-room, and dissecting-room are kept in beautiful order, and would compare favorably with our more modern institutions. There are six visiting physicians and surgeons and three resident physicians and surgeons.

The average daily number of persons under treatment may be calculated at 110 cases. On the 26th day of June there were under treatment in the medical wards 44 cases, in the surgical, 66 cases, and 16 convalescents.

The mean annual mortality is 200. In 1870 it was 204; in 1871 it was 207; in 1872 it was 203.

Hospital of San Carlos.—The military hospital of San Carlos is situated in the northeastern portion of the city It is a large one-storied building, with four wards, three of them running parallel with each other, the fourth being a smaller ward, and intended only for the officers. It is built of coral limestone, with walls 16 inches thick, and a high, arched ceiling. Ventilation is good, having windows reaching from the ceiling to within 2 feet of the floor. Between the windows and near the roof are circular apertures, 2 feet in diameter, which cause the introduction of a sufficient amount of air. The adjoining wards open into each other by means of arches. It can accommodate 300

patients. The cubic capacity for each patient is 200 cubic feet less than that of San Sebastian.

Hospital de Nuestra Senora de Loreto.—This is a small hospital, founded in 1640, consisting of two wards, a medical, with 23 beds, and a surgical ward, with 41 beds, making a total of 64 beds. It was intended originally for the treatment only of diseases of women, but of late years, for want of a more suitable building, it has been used for the confinement of women guilty of misdemeanors. In this hospital there is a small library of 300 volumes, the largest collection of medical literature in the city. The average number of patients in the hospital is 100.

SANITARY REPORTS.

EUROPEAN SQUADRON.

1874.

EUROPEAN SQUADRON.

1874.

REPORT OF A. L. GIHON, M. D., U. S. N.,

Surgeon of the Fleet.

U. S. FLAG-SHIP FRANKLIN.

In transmitting the annual returns of the several vessels on this station, for the year ended December 31, 1874, I have great pleasure in calling your especial attention to the instructive and elaborate sanitary report from the United States ship Juniata. There has been a notable increase in the number of venereal cases, from a total of seven during the second quarter of the year to thirty-one during the third, and sixty-five during the fourth; and the serious influence of these scourges upon the effective *personnel* of the fleet makes the question of their prevention one of peculiar urgency, and gives especial interest to the report of Surgeon Walton. All the vessels of the fleet have been cruising among countries where sanitary inspections are not required or are only imperfectly performed, whence the marked contrast of this feature of their present health-returns to the experience of former quarterly periods on this station when their visits were restricted to French and Italian ports.

I have informed Surgeon Bradley that the reports which he states in the last paragraph of his sanitary report he is in the habit of transmitting, "the day after leaving port, to the commanding officer, respecting the sanitary regulations of said port, together with the amount and character of hospital-accom-

modations found therein," do not absolve him from the duty of making an annual report to the Bureau on the 1st of January on the same subjects.

Medical Inspector Dean has made no sanitary report, for the reason that the extended report which he contemplates, in connection with the special duty with which he is charged, will comprehend and more fully illustrate all the data he would have been able to present at this time. For a similar reason, the Congress and Franklin having cruised in company almost uninterruptedly since their return to the station, I have concluded to omit what I would otherwise have communicated respecting the hospital-establishments of the ports we have visited together. I have, therefore, only to refer you to the special sanitary report which I addressed you from Key West on the 31st March, in which the hygiene of this vessel was very fully discussed. I have still to regret the abandonment of the practice of painting the berth-deck, which was productive of such evident benefit to the health and comfort of all on board. Two recently-outfitted vessels on this station, the Austrian frigate Kaiser and the Russian frigate Prinz Pojarsky, have their berth-decks covered with canvas floor-cloths; but, where the practice of daily wetting this deck is persisted in, as in our own service, this is manifestly inferior to the painted or shellacked deck.

The inconvenience of the berth-deck sick-bay has been more than ever felt since the late increase in the number of sick. Several of the European navies have recently established sick-bays on the after portion of the gun-deck, the apartments being cheerful, well lighted, and perfectly ventilated, and having the dispensaries adjoining and opening into them. At Toulon there were two French men-of-war with sick-quarters on the forward end of the gun-deck, the portion of the battery inclosed being, like the cabin-guns, exempt from daily exercise. In both these ves-

sels the hawse-pipes opened below the deck, so that the patients were in no way incommoded by the chain-cables in coming to anchor or getting under way. The present site of the sick-bay in our large vessels, and especially so in this ship, is further objectionable on account of the impossibility of protecting it from leakage from the water-closets on the deck above.

I beg to recommend the supply of a small ice-machine as an appointment of every sick-bay, especially on this station, where ice is so little in common use as to be obtainable with difficulty. The Russian flag-ship, now at Villefranche, has a small Carré machine, which supplies more than a sufficient quantity for the use of the sick, with very little trouble, and at a trifling expense.

I have to reiterate my opinion of the need of a small, inexpensive hospital-establishment at the headquarters of this station. This would obviate, to a great extent, the necessity of leaving patients at distant ports, whence it is often difficult to return them when restored to health. A man belonging to the crew of the Juniata, who was placed in the hospital at Barcelona some months ago, still remains there, at the expense of the Hospital Department, although long since reported well. Two from the Congress are similarly detained at Gibraltar. Moreover, very few of the hospitals on the Mediterranean sea coast are conducted in accordance with the advanced views of the day, and it is desirable, therefore, that we should retain the care of our own sick, which can only be done in a building under our own exclusive control. Such an establishment might also be constituted a depot for medical supplies. In any event, I recommend some change from the present manner of keeping medical stores for distribution on this station. They are now merely placed in a small, inconvenient room, scarcely more than a closet, at the store-house at Villefranche. The naval storekeeper disclaims any responsibility for their care, the surgeon

of the fleet alone receipting for them. Within the past week I have learned that packages of the more expensive articles, such as morphia and strychnia, which, from their small size, can be easily abstracted and secreted, have been offered for sale in Nice by a person supposed to be an apothecary. A repetition of this has been attempted to be prevented by the re-issue of an order requiring the presence of a commissioned medical officer whenever the room is opened or stores removed. This occurrence, with other acts of misconduct, such as habitual drunkenness, and which have compelled me to revoke the appointment of the apothecary of this vessel, without being able to properly supply the vacancy, illustrates the necessity for a better class of persons for this important office, which can only be accomplished by giving them the status and quarters of clerks in the steerage.

I inclose a price-list of medicines I have purchased for the several vessels of the fleet from Messrs. Donato & Co., 9 Quai St. Jean Baptiste, Nice. This establishment is under the control of an experienced English apothecary, (Mr. Winters.) The articles supplied have invariably been of excellent character; many of them, the fluid extracts, have been expressly prepared to meet the requirements of our supply-table, and the prices are less than those I have had to pay for articles of the same quality elsewhere.

I also inclose a specimen of a new method of preparing the powerful remedies, such as the salts of arsenic, strychnia, atropia, veratria, morphia, &c., for internal administration in small doses, which I obtained from its author, M. Henri Sermant, at Marseilles, and which has received the approval of Mialhe and other French authorities.

Reports of Michael Bradley, M. D.,

Surgeon U. S. Navy.

U. S. S. Alaska.

The complement of officers and men of the U. S. S. Alaska is 300; cubic air-space allowed each individual on shipboard, 125 feet; percentage of sickness, 5; of mortality, 1.

Ventilation, although not perfect, will compare favorably with that of any vessel in the fleet; seven large hatches permit the atmosphere to enter and permeate every part of the berth-deck.

Lighting.—In addition to the hatches giving light, the sides of the sick-bay, berth-deck, steerage, and wardroom are amply supplied with circular glass ports on hinges, and can be used as ventilators.

Warming.—Ship heated by steam; one radiator in the sick-bay, three on the berth-deck, and two in the wardroom, all working well.

Water.—Potable, sometimes obtained from shore, and may be either rain or river water. Ship is provided with a distiller and aerator, can furnish from 75 to 80 gallons per hour; water is preserved in iron tanks.

Food.—The usual ship's ration is abundant and of good quality; a specimen of cooking is inspected daily; the men are furnished with fresh provisions four times weekly when ship is in port.

Clothing.—Of the ready-made garments some are strong and durable, others of indifferent quality; sheeting and satinet good; shoes of the Navy pattern.

Climatology.—Meteorological register is forwarded herewith.

MEDICAL TOPOGRAPHY.

I would respectfully state that the day after leaving port I transmitted to the commanding officer a report respecting the sanitary regulations of said port, together with the amount and character of hospital-accommodations found therein.

THE MORGUE, PARIS.

I never fully comprehended the full weight, terrible truth, and awful grandeur of the sentence, "In the midst of life we are in death," so often uttered over the remains of the departed, until I paid my first and only visit to the gay, cheerful, and frolicsome capital of France. The revelation was made by mingling with the lively Parisians as they thoughtlessly laughed, chatted, sat, and walked on the brilliant streets that spread over the catacombs, the subterranean vaults and passages, containing the bones of thousands of human beings; entering and leaving omnibuses with them at the Place de la Bastille, where so much blood was shed during the civil wars; promenading with them on the Place de la Concorde, where Louis XVI and his consort, Marie Antoinette, were executed; transacting business with them in the Quartier Latin, where shops and dissecting-rooms adjoin each other; and, lastly, attending service with them in the church of St. Germain l'Auxerrois, whose bell tolled the signal for the commencement of the massacre of the Huguenots on the eve of St. Bartholomew, 1572.

Wherever I turned or went with the active, bustling throng, I was sure to meet monuments commemorative of departed greatness, as the Pantheon, Hôtel des Invalides, and the cemetery of Père la Chaise will attest.

Having finished the preliminary remarks, I will now take up the subject of this paper, the morgue of Paris.

The first morgue erected in Paris was in the year 1542; the second in 1804, on the Ile de la Cité, at the end of the bridge

of St. Michel, within a short distance of the portals of the cathedral of Notre Dame. The structure was 60 feet wide, 45 feet deep, and contained but one room. The present morgue was erected about ten years ago, and, like the old one, is located on the Ile de la Cité, behind and within a stone's throw of Notre Dame. It is substantially built of yellow sandstone, one story high, and presents a front of 150 feet, with a depth of 30 feet. In the middle of the building is the exposition hall, where the bodies of unknown persons are deposited for four days; if the state of the body permits, five days. They are placed behind a glass partition, on inclined black marble slabs, twelve in number, arranged in two rows. The bodies are nude, kept moist and at a low temperature by small streams of water playing upon them. The clothes are also exposed, and often lead to the identification of the late wearers. Bodies badly decomposed are not placed on exhibition; are kept in an adjoining room (salle des morts) for three days, and if not recognized sent to the public cemetery, the transportation taking place at 6 a. m. from 1st April to 30th September, and at 7 a. m. from 1st October to 31st March.

The morgue is open daily to the public from 8 a. m. to 6 p. m. in summer, and from 8 a. m. to sundown in winter. Adjoining the exposition hall is the office. The registrar (greffier) and his clerk are on duty from 10 a. m. to 4 p. m. Here everything that is known of the deceased is carefully registered—the name, age, description, vocation, when and where found, cause and kind of death, and if delivered to friends or sent to the potter's field.

The registrar is in constant correspondence with the chief of police, who has control of the morgue. La salle des morts contains fourteen marble slabs, with arched zinc covers. Bodies too much decomposed for the exposition hall are kept here three days, and are subjected to the irrigating process. La salle

d'autopsie is used by the medical inspector and his assistant when there is a suspicion the deceased has been murdered or poisoned.

One of the two attendants (garçons de service) is always on duty. They cannot have their wives or children, cannot take their meals nor prepare food, within the inclosure; in other words, they are not permitted to make a home of the morgue.

The annual average for the last ten years of the number of dead bodies exposed at the morgue is 340, including men, women, and children found in all parts of the great city of Paris.

REPORT OF T. C. WALTON, M. D.,

Surgeon U. S. Navy.

U. S. S. JUNIATA.

HYGIENE.

Complement of officers, 25; of men, 225. Cubic air-space allowed each individual on shipboard: commanding officer, 4,800 feet; wardroom-officers' state-rooms, average, 1,800 each. Wardroom-country affords about 146 cubic feet to each person. Steerage-officers, when complement is full, 147 cubic feet each; warrant-officers, 220 each. The steerage-country is common to the latter two, and contains a net space of 2,400 cubic feet.

Sixty of the crew are billeted in the forecastle, and have about 100 cubic feet each. The remaining 165 sleep on the berth-deck, and have about 55 cubic feet each. Twenty-nine of the crew have no sleeping-billets.

Full particulars concerning the air-space on board were furnished in the sanitary report for 1873.

Percentage of sickness and mortality.—Admissions, or number of persons sick during the year, 85.417 per cent. There were no deaths on board during the year.

Ventilation.—This subject was fully enlarged upon in the last sanitary report from this vessel, dated January 1, 1874. During the past year the spare spars, mentioned as interfering with the ventilation and lighting of the berth-deck, have been removed. No change has been made in the ventilators of the after part of the berth-deck. They should be extended above the ship's rail. At present they are not more than 3 feet in length.

Lighting and warming alluded to in the last sanitary report.

Water.—An apparatus is required on board by which the condensed water (which is chiefly used) would be thoroughly aerated before entering the tanks.

Food.—The Navy ration is generally satisfactory. The canned beef is not palatable to many of the crew; few of them eat it when they can obtain anything else. If fresh potatoes were furnished the crew during long voyages, instead of allowing them to be irregularly provided by themselves, it would be beneficial. The desiccated potato is a miserable substitute.

Clothing.—The ready-made clothing provided on shipboard is generally poor in quality, ill-fitting, and not uniform. The boots and shoes are badly made, and of poor material. On a foreign station, when the crew are allowed money, these defects do not affect them materially, as they provide themselves with better articles, and often at less cost, in the principal ports visited. In this respect the suggestion to give the sailor three months' pay, in lieu of an outfit of clothing, would prove beneficial to him.

General hygienic considerations and suggestions.—The bilges of this vessel are improperly arranged and poorly ventilated. At the present time a collection of filth is believed to exist be-

neath the powder-magazine, which, at times, impregnates one-half of the ship with its deleterious odor, and it cannot be got at without removing the magazine-floor. A faithful compliance with the recent order concerning the inspection of bilges will prevent vessels leaving a navy-yard in as dirty a condition as this one did.

The comparative immunity from serious illness the crew of this vessel has enjoyed during the past year may, in a great measure, be attributed to the scrupulously clean condition of her berth-deck and holds and to the free use of whitewash.

The necessity for better sleeping-accommodations for the crew is indicated by the limited air-space each man is allowed, less than 55 cubic feet, and the fact that swinging-billets cannot be provided for twenty-nine of the crew, every available inch being occupied by the others. These twenty-nine men sleep on mess-chests, or on the deck, night after night throughout the year. This condition of things is incompatible with continued health. Nothing but the mild weather we have enjoyed during the year has prevented serious consequences. A vessel of war of this class, whose complement of men during time of peace is greater than her berthing accommodation, is either faulty in construction or there is an error in the calculation of the complement. The defects alluded to may, in a measure, be remedied by the extension of the top-gallant forecastle farther aft, and the placing of the ship's galley under it.

CLIMATOLOGY.

There are no meteorological instruments under the control of the medical department of this vessel, as mentioned in my last sanitary report.

MEDICAL TOPOGRAPHY.

The cruise of this vessel during the past year has extended from New York to Key West, where she took part in the naval

drill; from there to the Azores, in April last; thence to Cadiz, Spain. She entered the Mediterranean near the end of May, and cruised along the south coast of Spain, calling at most of the ports; reached the coast of Italy in July, and continued along its entire coast, visiting most of its sea-ports during the summer and autumn months. Cruised along the eastern side of the Adriatic, as far south as Zante, part of September and October, and returned to the west coast of Italy in November, calling at two Sicilian ports on the way.

Azores.—Our stay among these islands was limited to seven days at Horta, island of Fayal, and one day at Ponta Delgada, island of San Miguel. Fayal contains about 25,000 people; Horta, the best sea-port in the Azores, about 8,000. It is located at the foot and on the sides of a range of hills that slope to the sea on the southeast coast. Its streets are narrow, clean, and well paved. The houses are built of stone. The majority of them are low and badly ventilated; their lower stories are generally damp, having only imperfect natural drainage.

The adjacent country is highly cultivated; vegetation appears luxuriant. The principal cereals and many tropical fruits are grown.

The annual temperature ranges from 45° to 80°. Amount of rain-fall unknown; it must be great. Principal diseases are pulmonary, rheumatic, and venereal. The two former may be attributed in part to the climate, but chiefly to the poor diet and the comfortless damp dwellings of their victims; the latter to the frequent intercourse with foreign sailors. Horta has a foundling-hospital, home for aged mendicants, and a general hospital. In the first the system of farming out the children is adopted. The last two are under one management, and are in the same building, an old structure used formerly as a monastery. The hospital proper consists of a few small rooms for private patients, and of four wards, containing 20 beds in each.

The latter are long, low, and narrow, badly ventilated, and lighted by small windows on one side only. About 90 patients can be accommodated in the building. Strangers are kept apart from the natives, and are required to pay 70 cents per diem hospital-fee and 80 cents per diem for medical attendance. Forty deaths occurred during 1873 out of a daily average of 40 patients. The establishment is miserably furnished, poorly managed, and ill-adapted for the purposes required of it.

There are five medical practitioners on the island of Fayal; all of them reside in Horta and serve in the hospital. San Miguel is the most populous island of the Azores. It has 125,000 inhabitants; 18,000 of them live in Ponta Delgada, the largest town. In it is an excellent general hospital, with accommodations for 300 patients. It has averaged 250 inmates the past few years, and about 20 outdoor patients have been prescribed for daily. The building is of modern construction, and is well adapted for a hospital. The wards, eight in number, for general patients, are long, narrow, and high, well ventilated and lighted, furnished with iron bedsteads, each containing a well-made straw mattress and pillow, a pair of gray blankets, clean cotton sheets and pillow-case, and a neat, blue coverlet. At the side of each bed is a close-stool, consisting of an open frame suitable for sitting upon, and a covered chamber-pot beneath. Adjoining each ward are water-closets, bath-room, scullery, and nurses' apartments. Three nurses are in attendance on each ward, and four doctors on the entire establishment. The latter reside out of the building, and are private practitioners. They each receive about $500 per annum for their hospital services. The hospital has about 40 employés; it is well endowed by legacies and donations, and has an annual income from landed property alone of about $40,000. Sick foreigners can obtain admittance through consular agency. They are provided with private room and nurse, medical attendance, and

everything necessary for their comfort, for 80 cents per diem each patient. Natives are admitted free. Residents complain that their servants leave them on having the slightest ailment for a few days' rest in the hospital.

There are no diseases peculiar to the Azores. A few cases of inherited elephantiasis græcorum exist on one of the islands. Variola has been prevalent throughout the group during the past few years. Vaccination is voluntary, except in San Miguel; there it is compulsory. In the interior of San Miguel are warm sulphur-springs, and in their vicinity baths have been erected. They are much patronized by natives and foreigners. Good accommodations at the baths can readily be obtained at a reasonable price.

Altogether San Miguel is a desirable resort for invalids requiring an equable, mild climate. The temperature seldom passes from between 55° and 75° Fahrenheit. The necessaries and even luxuries of life can be readily obtained at a moderate cost. Society is agreeable, medical attendance is good, schools are fair, and the surroundings generally of Ponta Delgada are pleasant throughout the year.

Quarantine regulations in the Azores, for suspected vessels arriving at any of the ports, are very annoying. The vessels are required to proceed to Lisbon to perform quarantine, and to obtain a clean bill of health from there before they will be granted pratique.

Spain.—Our stay in Spanish ports was too short to obtain much reliable information.

Cadiz has one military and two civil hospitals, also a medical college.

Malaga has a military hospital and a large civil establishment, not completed, but partly occupied, as a hospital. Also the "Noble Hospital," named after an Englishman, its founder; it has accommodations for about 40 patients, and is intended

for the reception of sick foreigners, who are admitted, through consular agency, at a charge of 50 cents each per diem. Good nurses can readily be obtained from among the Sisters of Charity; they will attend any private house or hotel on payment of their board.

Cancer, in all its varieties, is said to be very common—cause unknown. The climate is very dry, and the winter is reported as being especially favorable for those afflicted with pulmonary diseases.

Barcelona has several charitable institutions. Among the most interesting is a Protestant missionary establishment, located in the suburb of Gracia, under the superintendence of the Rev. Joseph Lawrence. In connection with it is a "Home for the Sick Stranger." It is intended to be non-sectarian in its character. Any poor, sick, friendless person will be admitted and cared for free of expense. The nursing and kind, intelligent care bestowed on its sick inmates is far superior to any obtainable in the public institutions of any Mediterranean sea-port. About 100 patients can be accommodated. An able medical practitioner is employed to prescribe for them, while the nursing and other attendance is cheerfully given by the missionaries, their wives, and assistants. The financial support is derived chiefly from contributions from England and America. The management seems to be, in every way, worthy of material assistance from foreigners generally.

All the Spanish ports visited possess a military and one or more civil hospitals. The universal complaint of the managers of the latter was want of money to conduct them properly, owing to the monetary stringency created by the civil war.

Venereal diseases are very prevalent, particularly in Barcelona; and although prostitution is licensed, the medical examination of the prostitute is to a great extent voluntary on the part of the woman.

Italy.—The principal sea-ports resemble those of Spain in each possessing military and civil hospitals. They are also alike in not having separate buildings provided for the reception of patients with contagious diseases. Isolated wards in the hospitals are generally used for that purpose.

The general hospital at Spezia has accommodations for 100 patients. During the past year about 80 beds have been occupied. It is in fair condition; the wards are clean and passably ventilated. The nurses are Sisters of Charity. Many of the injuries received in the adjacent marble-quarries and arsenal are treated in it. The attending physician and surgeon each receive $500 per annum from the municipality for their hospital services.

Leghorn, like most of the Italian cities, is clean and well built. Its streets are passably wide, finely paved, have excellent drainage, and are kept clean. It has three hospitals, military, Jewish, and civil, a lying-in establishment, a poor-house for aged men and women, an orphans' home, and a "society for mutual succor." The last numbers many wealthy and prominent men; it is supported chiefly by voluntary contributions, and its principal objects are to aid the sick and bury the dead. Societies of the same nature exist in most of the Italian cities; their members, when attending funerals, wear masks and gowns. The municipality provides medical attendance for the sick poor who can be treated in their homes.

The Jewish hospital is a small affair, supported by a few wealthy Jews for the relief of the poor of their own faith.

The general civil hospital is supported by the municipality. It has accommodations for 500 patients, and has averaged half that number during the past year. It is kept in good order, and is under liberal management. Foreign patients are admitted in a ward set apart for them on payment of 45 cents per diem for each person, in private wards for 70 cents per diem.

There have been six epidemics of Asiatic cholera in Leghorn, in the years 1835, 1837, 1859, 1866, 1867, and 1871; the first two were the most severe. In 1806 yellow fever was brought there from the West Indies; it committed extensive ravages throughout the city. Since then there have been no cases of the disease among the residents. The city was visited once by the plague, about the year 1808.

Leghorn has upward of 100,000 inhabitants. Among them are 170 licensed prostitutes and 28 houses of prostitution. As the Livornese are not especially noted for their chastity, the inference is that the laws concerning clandestine prostitution are not strictly enforced. There were 250 admissions to the hospital for venereal diseases during the past year from among the licensed women.

Venice has one general civil hospital, a large building, or group of buildings, used formerly as a nunnery, situated near the center of the city, and approachable by canal and street. It contains 1,800 beds, and has averaged 1,000 patients daily during the past year. Besides a number of rooms for private patients, it has 62 public wards, containing from 20 to 100 beds in each. The wards are separated into three sections, for men, women, and children under 7 years of age; these are subdivided into medical and surgical, acute and chronic, venereal and obstetric wards. The nurses are Sisters of Charity; one nurse is required to attend to ten patients, but can have assistance whenever necessary. Nine professors and twenty-two doctors constitute the professional staff; the former live out of the building, and are private practitioners of local eminence; they receive $1.20 per diem for their hospital services; the latter reside within the building, and receive from $12 per mensem and board to board alone, according to length of service. Poor Venetians are admitted for treatment free; those who are able to pay are charged 26 cents per diem in public wards, 44 cents in private

wards of the second class, and 74 cents in private wards of the first class, where a special medical attendant and nurse are provided.

The hospital is supported in part by the municipality and in part by endowment. It is under municipal direction. Pulmonary and venereal diseases constitute the great majority of cases admitted. During the year 1873 there were 400 admissions and 44 deaths from Asiatic cholera. There are about 200 persons employed in the establishment. In connection with it are several operating-rooms, a large collection of instruments and appliances, many of them of modern origin, a morgue, autopsy-room, consultation-room, with small library of old works, and a small museum of pathological specimens. There is no medical school in Venice, but students from the university of Padua frequently visit the hospital during their vacation.

Adjacent to the hospital is a home for poor old men. It has about 800 inmates. In another part of the city is a similar establishment for old women. On islands near the city are two large buildings used as asylums for insane men and women. One was formerly a monastery, the other was erected for its present purpose. There are about 600 persons in each. They contain the insane from Lombardy and Venetia.

Austria.—Pola, the chief naval station, was visited in September. About 6,000 civilians and 10,000 persons in the military and naval services reside there. It has a small civil and a large marine hospital. The latter is a plain stone building, located on elevated ground, surrounded by a garden and shrubbery. It is in charge of an "oberstabsarryt," (medical inspector,) who has eight junior medical officers under him. He, only, and his family are provided with quarters in the building. One of the assistants is required to be constantly on the premises. When off duty they are the only officers on the station allowed to dress as civilians.

The hospital has accommodations for 400 patients. It has had a daily average of [illegible] during the past year. Its wards are large, fairly ventilated, and contain about 20 beds in each. They are arranged in three divisions, two medical and one surgical. There is also a ward set apart for boys, and another for women and children belonging to the families of warrant and petty officers, and a number of rooms, with single beds, for officers. Each division is in charge of a senior assistant surgeon. Contagious diseases are treated in an isolated part of the building. The furniture of the establishment is very plain, and not overabundant. The bathing facilities are good; they include plunge, shower, and vapor baths. The patients' food is furnished on contract by a civilian. There are no restrictions regarding the diet to be prescribed; neither are there any in regard to medicines or appliances. Whatever the "oberstabsarryt" requires can be obtained. Most of the supplies are furnished from the military laboratory in Vienna.

Officers are allowed to remain in the hospital, under treatment, six months; a further stay must be upon recommendation of a medical board of survey. They are required to pay 30 cents each per diem for subsistence. The families of warrant and petty officers are entitled to hospital accommodations free of charge. Connected with the hospital are store-rooms, containing medical supplies for all the vessels of war lying in ordinary and fitting out at the station. The stores are kept in readiness, marked, and set apart for the vessels they are intended. Among them were noticed ice-making machines, Toselli's patent. One of them is supplied each vessel. The surgical instruments and appliances are liberal in variety and after the most recent and approved models. The senior medical officer on board each ship is held responsible for their proper care, and he receives an addition to his salary on account of that responsibility.

In the village of Vilano, about six miles distant from Pola, is a small hospital, pleasantly situated in a healthy locality. It is under the same management as the marine establishment in Pola. A surgeon and assistant are in special charge. It has accommodations for 200 patients, and has averaged 50 inmates during the past year. It is intended principally for convalescents, particularly from malarial diseases. It is well ventilated, kept in excellent order, has extensive grounds, and, altogether, seems well adapted for the purposes intended. In accordance with an Austrian law, the dead-houses of all the hospitals in the empire are provided with means by which their keepers will be notified in the event of the re-animation of a supposed corpse. A cord is suspended over each table intended for the reception of a corpse. On one end is a ring, to be placed on a finger of the occupant of the table; the other end is attached to a bell in the keeper's apartment, which is supposed to be rung on the slightest movement of the hand having the ring. It is required that the corpse shall remain on the table at least twenty-four hours. Pola and its vicinity, until quite recently, was badly affected by malaria; latterly it has been very much relieved by the improved and systematic drainage of the marshy districts. Vilano is free from malaria. In 1873 variola prevailed epidemically in both places. Venereal diseases are rare, owing to the frequent inspection of the men in the military and naval service, and the strict weekly examination of the prostitutes.

There are seven schools of medicine in Austria, all of them connected with universities. Possession of a diploma from any of them entitles the holder to admission into the medical corps of either the army or navy without mental examination. A high standard of education is maintained in the medical schools.

Ionian Islands.—Corfu has two hospitals, civil and military, a pest-house, and an asylum for the insane of the Ionian Isles.

The civil hospital averaged 40 patients daily during the past year. It can accommodate 90. It is kept in good order, and supported principally by charity.

The town has about 18,000 inhabitants. Its streets are narrow, dirty, and devoid of sewerage.

The principal diseases are pulmonary and malarial. Variola is endemic throughout the group, also along the Turkish and Dalmatian coasts.

A free translation of the principal regulations relating to prostitution in the Italian kingdom, at present in force, is hereunto appended, in the hope that it may be of some interest to the Bureau.

REGULATIONS FOR PROSTITUTION IN ITALY.

Prostitution is in charge of the sanitary service. The officers of said service consist of a chief inspector, inspectors, delegates, sanitary officers, medical examiners, and watchmen or police, all of whom are under the direction of the chief of police. The chief inspector exercises general supervision; he reports to the minister of the interior. One inspector resides in each of the principal cities, a delegate in the smaller ones, and a sanitary officer in every district where one is considered necessary. Medical examiners are appointed for each district by the inspector—Spezia has one, Leghorn two, Florence three. The watchmen are policemen selected from among the most trustworthy of the force. For the faithful performance of their duties in this service they are specially rewarded.

Any woman detected in the act of prostitution or publicly known to be guilty of it will be compelled to appear before the sanitary officer to be registered, to submit to an examination by the medical officer, and to be subject to the regulations for clandestine prostitution. A woman, on entering a house of prostitution for the purpose of following the avocation of a

prostitute, is required to appear before the sanitary officer and declare such to be her intention; if, after being warned of the consequences, she persists, her name and description, the names of her parents, their place of residence and trade or calling, and her reasons for adopting the life of a public prostitute will be registered in a book to be kept in the sanitary office.

Each prostitute receives a ticket with her name, description, abode, and date of sanitary visits written upon it, and on it is printed the following paragraph: "Any prostitute desiring to reform, her parents will be informed of it, and if they refuse to receive her, she can be sent to a Magdalene's home and be kept there under surveillance for one year, when, if her conduct warrant it, she will be allowed to remain or depart as a virtuous woman."

The tickets are non-transferable; they must be produced whenever the police ask for them; when lost, a substitute can be obtained; it will be marked as such.

If any prostitute desires to change her residence, she will apply to the chief of police, through the sanitary officer. Changes are authorized only on account of health or family reasons.

Prostitutes are not allowed to change their residence nor be absent from it longer than three days without permission.

The sanitary officer is to be informed when prostitutes are sent to a hospital and when they leave it. Before leaving they are to be examined by the medical officer. During their stay in the hospital their tickets are to be kept in the sanitary office.

Prostitutes cannot live in a house where liquor is sold. They cannot go on the streets drunk or indecently dressed, or appear at windows or doors, or stop in the street, or walk in public places, or commit indecent acts in public places, or solicit men, or make themselves known by word or sign, or be out of doors

after 8 o'clock p. m. from October to March inclusive, or after 10 o'clock p. m. the rest of the year, without just cause. They are forbidden to walk on the streets near their dwellings, or to visit frequently places of public amusement, or act indecently while there.

If a prostitute lives as a mistress she will be subjected to sanitary visits, unless her keeper is recognized as a man of means and agrees to be responsible for her. He must notify the sanitary officer of that fact, also when his responsibility ceases.

If on ceasing to be a mistress the woman resolves to reform, she will notify the sanitary officer, and inform him of her place of residence and means of subsistence. She will be subjected to sanitary visits weekly for three months; at the expiration of that time, if her resolution has been faithfully carried out, her name as a prostitute will be canceled.

Marriage exempts her from sanitary inspection if she declares her good behavior.

Should she deposit money in a savings-bank during her probationary period and leave it there three months, she will receive one-twentieth more, in addition to the interest, if her conduct has been good.

The following regulations are required to be posted in all houses of prostitution:

There are two categories of brothels tolerated, viz: First, those in which prostitutes have a fixed domicile; second, those to which isolated prostitutes go for motives of prostitution.

The two categories are divided into three classes: In the first class are those prostitutes to whom access can be obtained for five francs or a larger sum; in the second class the tariff is between two and five francs; in the third class the charge is less than two francs.

The authority to open a brothel is obtained from the inspector

or delegate in the bureau of public security. It is personal, essentially temporary, and revocable. It will not be granted to those who have been imprisoned for robbery or any crime against person or property.

In the application for license or authority must be stated the exact locality of the house intended to be opened, the number of prostitutes destined to live in it, the class to which it is to belong, and the fixed price.

The consent of the proprietor of the house must be obtained.

The same individual is not permitted to keep brothels of different categories.

Authority will not be granted to establish a brothel in a principal street, or near a house of education or public building.

The keeper of a brothel is obliged to see that the house is kept in the best possible order, and to procure everything ordered by the medical examiners.

The keeper is also obliged to see that the prostitutes are present on the day and hour fixed for the sanitary visit.

The keeper is forbidden to provoke or force the prostitute to accept the addresses of men.

The keeper cannot on any occasion refuse the admission of the police, by day or night, when it is deemed necessary for the public security.

The keeper cannot admit into the brothel a prostitute without first advising the sanitary officer.

The number of prostitutes allowed in each house is determined by the sanitary officer.

The keeper must declare at the sanitary office the names in full, ages, and country of the persons employed in the brothel: When the sanitary officer thinks it necessary, the employés under forty years of age and the mistress of the brothel, if not married, or if separated from her husband, will be subjected to the sanitary visit. In both cases the visit will be gratis.

In brothels of all classes must be kept a register, signed by the sanitary officer, one page of which will be allotted to each prostitute, and on it will be inscribed her name, age, country, last place of residence, date of entrance and of exit, and the locality or house to which she may have gone, according to a prescribed form. When a prostitute wishes to change her residence, or the keeper of the brothel desires her to do so, she must present herself at the sanitary office, in order that the change may be noted on her card, the books of the office, and the register of the brothel.

Every woman found in a brothel of any class, without a ticket or without having made the required declaration, will be considered as given privately to prostitution; and the keeper of the brothel will be punished by suspension of license, or revocation of it. The keeper of a brothel of the first category is required to provide board for the prostitutes living in the brothel, their clothing for the street and the house, to pay for their sanitary visits and all their necessary expenses in case of sickness, whether treated in the brothel or at a hospital; also to provide their dress and underclothing, and all that is necessary for the cleanliness of the same during their stay in the brothel or hospital.

When a woman enters a brothel to reside there the keeper must take an inventory of all the articles belonging to her, and enter the same in the register she is required to keep.

When the keeper has any money belonging to the prostitutes, a declaration to that effect is required to be made in the sanitary office, and a receipt given for the money. During the stay of a prostitute in a brothel she is not to use her own clothing; it is to be retained by the keeper and returned to her when she leaves the brothel, together with all she may have purchased with her own money, and which must, at the time of purchase,

be entered in the inventory. The register containing the inventory of the things of the prostitute will be verified at the sanitary office. The keeper must not, under any pretense, lend the money of the prostitute, even to mutual friends, or derive any advantage on account of it.

The hire of prostitutes is divided as follows, viz:

Prostitutes in brothels of the first category receive one-fourth, the keepers three-fourths. Those frequenting brothels of the second category receive two-thirds, and the keeper one-third. The division of gains takes place every fifteen days. Prostitutes who have debts to be deducted, which have been recognized at the sanitary office, will be required to pay one-half of their receipts toward the liquidation of their debts, and the balance will be carried over to another settlement.

It is absolutely forbidden for the keeper to put the prostitutes under any penalty for keeping an appointment, or to maltreat them in any way.

The keeper is also forbidden to admit into a brothel any girl under sixteen years of age. In case of transgression the license will be revoked.

If any prostitute express a desire to reform, the keeper must inform the sanitary officer, and by him she will be encouraged to carry out her good resolutions. The fact of the prostitute being in debt to the keeper will not be an obstacle to her leaving the brothel.

The keepers of brothels are required to pay, besides the quota for the sanitary visits, the following sums annually:

Brothels of the first category, first class, four hundred francs; second class, two hundred francs; third class, one hundred francs. Brothels of the second category, first class, two hundred francs; second class, one hundred francs; third class, sixty francs. Payments for the sanitary visits will be made

every fifteen days; those for the licenses every three months, in advance.

The keepers of brothels are required to keep a copy of their regulations in a place accessible to the prostitutes, and to make the rules known to them; also to have indicated on the said copy the class to which the brothel belongs, and the tariff.

It is forbidden to change the class or price without first making a declaration in the sanitary office.

Every controversy which arises between the keeper of a brothel and the prostitutes, if not of a criminal nature, will be referred to the sanitary officer for settlement. The director of the office of public security will order the immediate closure of brothels open without license, and the women found in them will be inscribed as prostitutes. Gambling is prohibited among prostitutes of both categories, and the prostitutes are forbidden to provide food or drink of any kind.

Anything left in a brothel, belonging to a prostitute who has gone elsewhere, must be consigned to the sanitary office. The brothels must be closed at the hours determined by the sanitary officer.

The keepers of brothels must not absent themselves from the brothel without first obtaining permission from the sanitary officer.

All registered prostitutes are subjected to two sanitary visits weekly.

The visits will be regularly noted in the register kept in the sanitary office.

Prostitutes living in brothels of the first category are visited at the brothel. Those of the second category are visited at the brothel or at the sanitary office, as the inspector may direct. Those of either category, if not in the brothels at the time of visit, must, on the same day, go to the sanitary office and be examined. Any prostitute failing to be present at the sanitary

visit, without notifying the sanitary officer, will be arrested and compelled to be examined.

Extra visits will be made when thought necessary.

Extra visits do not dispense with the ordinary ones; no tax is paid for them.

The medical officer, after every ordinary and extra visit, must enter, in the prostitute's book and on the register at the sanitary office, the date of the visit, the sanitary condition of the woman, and any other observation he may think necessary to make.

Every prostitute known to be infected with a contagious or constitutional disease will be immediately sent to a hospital, with a card from the medical examiner indicating the nature of her malady.

Prostitutes who have doubtful symptoms will also be sent to the hospital, where they will remain until they have recovered.

Any prostitute, not living in a brothel, found to be infected at the sanitary office, will be left to recover in the hospital at the expense of the office.

Prostitutes are generally taken to the hospital in a cab or carriage; and those living in brothels declared to be infected must be sent to the hospital without delay, under the charge and responsibility of the keeper of the brothel. The name of the woman infected will be written in another register; also her description, habitation, nature of her disease, name of the medical examiner, and his observations. If a prostitute, after being declared infected, will not go to the hospital, she will be arrested and taken there by force; and after her cure she will be imprisoned from five to fifteen days.

During the stay of a prostitute in a hospital her ticket must be deposited in the sanitary office, and on her discharge she must go to the office to obtain her ticket and state her place of residence.

The prostitutes and keepers of brothels must obey all orders of the medical examiners relating to medicines and sanitary measures.

The ticket which each prostitute is required to have will be charged for as follows, viz:

Prostitutes living in brothels of the first category, two francs. Those of the second category, first class, two francs; second class, one franc; third class, sixty centimes.

The tickets will be renewed annually.

The following charges will be made for sanitary visits, viz:

Prostitutes living in brothels of the first category, one franc. Prostitutes of the second category, when the examination is made at their place of residence, one and one-half francs. Prostitutes of the second category, first class, when examined at the sanitary office, one franc. Examination takes place on Mondays and Thursdays; second class, half a franc, on Tuesdays and Fridays; third class, gratis, on Wednesdays and Saturdays. The amount collected for taxes and licenses from the prostitutes and keepers of brothels will be invested by the sanitary officer and used solely for defraying the expenses of the surveillance of prostitution.

SANITARY REPORTS.

SOUTH ATLANTIC SQUADRON

1874.

301-302

SOUTH ATLANTIC SQUADRON,

1874.

REPORT OF E. R. DENBY, M. D., U. S. NAVY,

Surgeon of the Fleet.

FLAG-SHIP LANCASTER.

HYGIENE.

The complement of officers and men for this vessel, as allowed by the Navy Department, is believed to be about 455, but as this number is rarely on board, the inclosed table, giving the cubic air-space allowed to each individual, is based upon the number of men actually on board at the time, 378, which may be taken as a fair average. By this it will be seen that the average amount of air-space allowed the men is 161 cubic feet per individual; each steerage-officer, 337; each wardroom-officer, 679; the captain, 2,049; and the admiral, 2,802. The total number of sick-days for the year is 3,903, and the average number of the crew is 378, making a percentage of 2.93. During the same period but one death occurred, making the mortality 0.27 of one per cent.

Ventilation.—In the more elaborate table from which the one referred to in the previous paragraph was condensed, the exact dimensions of all the hatches is given on all the decks, and, with air-ports and wind-sails at proper periods, it would appear that an ample amount of ventilation was afforded. The only exception is the sick-bay, which, though possessing a cubic air-space of 3,060 feet, has no hatch communicating with the external air, and only a very small one opening on the gun-

deck. Situated, too, as it is, in the eyes of the ship, it is only in very smooth water that the plunges can be taken from the air-ports, so that any circulation is difficult to obtain even by an unsightly wind-sail led from the bridle-port across the deck and down the hatch mentioned. This is a serious defect, and I believe has been reported on several times. I know of no remedy that will compare with the one already adopted in most modern-built men-of-war of foreign nations, of giving up this time-hallowed portion of the vessel to some other department, and having assigned to invalids one not only where fresh air can always be obtained, but where there will be less motion.

Lighting.—During the day, in amount, this perhaps exceeds that of most other double-deck ships on account of the more ample dimensions of the hatches. The exception here also is the sick-bay, which, for the same reason that makes it the most indifferently ventilated part of the ship, makes it the worst lighted, necessitating constant artificial means if the sun is obscured by the lightest cloud or its rays intercepted by the spar-deck awning. The same remedy for the one fault would correct the other. At night there is an abundant supply of lamps and candles, and every part of the ship easily inspected.

Warming.—With the exception of the heat that is conducted from the engine and fire-rooms when under steam, that which emanates from the galley or may be procured by such extemporaneous expedients as hot shot, live charcoal, and stoves, there are no means of warming this ship. The defect lies in her not being supplied with steam-heaters, which, it appears to me, would not only conduce much to the comfort of the crew, but vastly to the preservation of health. These heaters, I am told, can be so arranged along the berth-deck as to keep the whole ship of almost a uniform temperature.

Water.—The distilling-apparatus and means of aerating the product appear to be all that could be desired. Though defi-

cient in the earthy salts, and not as palatable at first as that procured from natural sources, the men are generally very fond of this water, and no ill-effects have been observed from a continued use of it for several months. At Rio de Janeiro the ship was always supplied from the shore, and the water there collected in innumerable small reservoirs from countless crystal streams, that contribute so much to the beauty of the surrounding mountain-country, is perhaps unsurpassed in the world. The river Santa Lucia affords us that element here in sufficient abundance, and though all credit is due the company for the care they have taken in the location of their works, and having collateral mains leading to a lagoon whence a supply can be drawn when the main stream is charged with alluvial deposits after a freshet, yet it is never clear, contains animalculæ to a large amount, and many of the alkaline salts. Some fifty miles from its mouth the inhabitants claim for it medicinal virtues, and say that it is impregnated with sarsaparilla. No bad effects have been observed from its use on board, and, owing to the want of proper apparatus and reagents, I have been unable to determine its chemical composition. The water is admirably preserved in iron casks, and its use has been liberal.

Food.—The division of the crew into large messes of 18 men enables them to commute three rations, one of which usually goes to the cook, leaving two to be expended for vegetables, fruits, and eggs. This, with a supply of fresh provisions from the ship four days a week while in port, gives a diet which seems to be entirely satisfactory. The present system of a permanent board to survey articles of doubtful quality answers well in securing for the men wholesome food.

Clothing.—There is little to be said under this head, as the articles furnished are the same throughout the service.

The only suggestion that it occurs to me to make on the subject of general hygiene is that in vessels of this class all three

decks should not be washed down the same morning. The present plan is to prepare for a Sunday inspection by a universal cleaning of the whole ship, so that for hours, and in damp weather for days, there is no place where men who have had a night-watch or who are exempted from boat or other duty can sit or lie down. This might be obviated by cleaning the berth-deck on Friday and the other two Saturday: but, though the suggestion has frequently been made by me as a sanitary measure, I have never yet encountered an executive officer who was disposed to receive it favorably, and I doubt if it will ever be carried out unless made the subject of regulation. I am disposed to speak thus plainly, as in every quarterly return the preponderance of rheumatic and bronchial affections is out of proportion to other diseases, even taking into consideration the exposures to which men are subjected in the performance of duty. Most of these diseases are contracted, not while exercising on deck in drenching rains or standing watch in cold or inclement seasons, but from the insidious attacks of the enemy when the wearied system is off its guard in hours of rest or slumber, and no one who has passed many months in a ward-room, where greater protection is supposed to be afforded, can have failed to observe how extremely common some irritation of the air-passages is among its occupants. There appears to be a great diversity of opinion as to the use of shellac on the berth-deck, but whether it would be an advantage in a vessel of this class I should think questionable.

CLIMATOLOGY.

The accompanying table will give at a glance nearly all the information that I have been able to collate on this subject. The environs of the city of Rio de Janeiro, marked by lofty mountain-peaks, are subject at all seasons to sudden changes of temperature, that are keenly felt by the invalid. During the

summer rain-squalls, with vivid lightning and peals of thunder that reverberate with great effect among the surrounding hills, contribute much to the cleansing of the city and purifying the atmosphere. The regularity of the morning sea-breeze tempers the heat in the harbor and infuses new life into those confined on board ship. In the lower part of the river Plate the climate is generally equable, no great extremes being experienced. During the summer-months the heat is at times oppressive in midday, but the nights are always cool. Great care is required on this account in the selection of proper clothing. The principal feature in this connection in all this section of the world is the Pampero—a violent wind which gathers force as it sweeps across the vast pampas of the Argentine Confederation and sometimes does incalculable damage. Though so disastrous in its material effects, it confers many benefits to health. It drives before it the accumulated malaria, and for a short period renders endurable the air of cities at other times loaded with effluvia from deficient or absent sewerage, cess-pools, and urinals.

MEDICAL TOPOGRAPHY.

In the preceding paragraph some allusion has already been made to the topography of Rio. Of Montevideo it is only necessary in a paper of this kind to say that it stands on a tongue of land jutting into the bay. Nearly directly through its center is a ridge, down which, on either side, the city slopes to the water's edge, affording the greatest natural facilities for excellent sewerage. Considerable efforts have been made already in this direction by the municipality, but, as in the capital of Brazil, where the government has been at enormous expense to construct works for the purpose, the difficulty seems to lie more with the individual land-owners, who omit to avail themselves of such facilities. The prevalence of yellow fever on

practitioners, as will enable them to throw some light on this interesting subject. The Santa Casa da Misericordia of Brazil, as a charitable institution, hardly has its equal in the world. It is claimed that it was founded in the year 1545, but this must be an anachronism, or it was originally chartered in Portugal. Though discovered at the close of the fifteenth century, Brazil was only colonized in 1548; however this may be, the officials take much pride in showing a worm-eaten document, purporting to be an authority for its establishment or re-establishment, over the signature of Philip the Second. The main building is an imposing edifice, immediately on the bay, and in all of its departments is fitted up in a manner commensurate with its great importance and vast wealth. The whole interior is lustrous with marble and the numerous valuable highly-polished woods of the country. Nothing can exceed the exquisite finish and cleanliness of every part of it that I inspected. All of the pharmaceutical preparations are made on the premises, and that whole department is a marvel of taste and neatness. The dispensary has been furnished from the best shops in Europe, and is extremely rich in its appointments. One large room is devoted to instruments and surgical appliances, all of which are exposed in glass cases or neatly arranged in drawers, presenting a very handsome appearance. The principal wards are long, and, as in all establishments of this kind, contain too many beds, but there are a number of smaller rooms devoted to paying patients, and even private apartments may be procured for special patients. In both this and the insane asylum the care of the sick and all internal regulations are intrusted to the Sisters of Charity of the congregation of Saint Vincent de Paul. During the year from 1872 to 1873 there were treated in this vast institution 14,539 cases, of whom 10,526 were cured, 2,946 died, and 1,067 remained under treatment. Deducting 317 patients that succumbed within the first

twenty-four hours of their admission, the mortality was 18 per cent., a high rate; but during that time there were two epidemics. I may mention here, in parentheses, that notwithstanding all that has been cited in its favor there appears to be, especially among foreigners, an undercurrent of feeling against this hospital. Whether this prejudice has been brought about by professional jealousies or has any sound basis it is impossible to say. A brief summary of a few facts will afford some idea of the extent of this institution. Besides the principal hospital and insane asylum mentioned, four dispensaries are supported in different parts of the city, where the poor receive, gratuitously, alike advice and medicines. In one only of these, last year 7,050 persons were relieved. The insane asylum is one of the finest in the world, and possesses property to the amount of 900,000 francs. The foundling-hospital, with a capital of 590,720 francs; the orphan asylum, with 352,160; the asylum of Sainte Thérèsa, which is intended to receive, support, dress, and instruct a certain number of indigent girls, with 900,000 francs, and two cemeteries, are all dependencies, in the city of Rio, of the Casa de Misericordia. All of these together have a moneyed principal estimated at 42,000,000 francs, and the control of such a fund, with the direction of so many and varied institutions, involves the necessity of an elaborate governing organization. A most important establishment is the Leper Hospital, specially intended for people affected with elephantiasis of the Greeks. Last year it received 79 cases—56 males and 23 females; of these 9 were male children and 5 female. The receipts of this hospital were 294,144 francs, and the expenses 249,919. The accommodations are being largely increased by additions to the building. In Brazil there are two so-called "faculties of medicine;" one is resident in the capital, and the other in the province of Bahia. The course for students embraces six years, is conducted in each place by twenty-one pro-

fessors, and is taught under the following heads, viz: physical sciences, (particularly as applied to medicine,) inorganic chemistry, mineralogy, descriptive anatomy, (demonstrations and dissections,) botany, zoology, organic chemistry, physiology, pathological anatomy, internal and external pathology, clinical instructions, obstetrics, diseases of pregnant women and infants, topographical anatomy, operative medicine, dressings, materia medica, therapeutics, hygiene, and the history of medicine and medical jurisprudence. The number of students at the Rio school in 1872 was 470. The national museum is destined to be a great institution. It is divided into four sections: First, zoology and comparative anatomy and physiology; second, botany, agriculture, and the mechanical arts; third, geology, mineralogy, physical sciences; and, fourth, numismatology, archæology, the liberal arts, and usages and customs of the different species of the human race. The most remarkable collections are the geological and mineralogical, but the zoological department is rich in ornithological and ethnographical specimens. The national library contains 100,000 volumes, well classified and arranged. The public schools number 172, and were attended last year by over 12,000 pupils. Under the head of medical topography the Hospital de Caridad, Montevideo, has already been referred to. It is one of the most conspicuous buildings in the city, and the wards are large and well ventilated, but the odors that pervade the domestic part are suggestive of bad drainage, and zymotic diseases are suspected to be unnecessarily prevalent within its walls. It is under the care of the Sisters of Charity, and derives its revenues from the Beneficiencia lottery and other municipal sources. The medical attendant is a graduate of Dublin. The British hospital contains about 60 beds, distributed among five wards, is supported by private subscription, and professional service is rendered by the gentleman above mentioned, as at the "Caridad," and a late

assistant surgeon in Her Majesty's navy. There is a museum, containing mammalia, birds, fishes, reptiles, minerals, petrifactions, shells, fossils, skeletons, &c., and a small library of 3,653 volumes, on science, legislation, history, travels, and general literature. The university is presided over by a rector, vice-rector, and sixteen professors, with classes of jurisprudence, political economy, philosophy, mathematics, history, geography, Latin, English, French, and drawing. Attached to it is the faculty of medicine, which confers degrees and grants authority to foreign graduates to practice. A number of free schools are maintained by the municipality, under the direction of nine town councilors, called the junta economica.

Rio and Montevideo are the only two ports that have been visited since leaving the United States.

The cubic air-space of this ship and the amount to each individual on board are as follows: Gun-deck, 34,566 feet; per individual, 156; berth-deck, 23,582 feet; per individual, 168; average number of cubic feet per individual on gun and berth decks, 161. Sick-bay, 3,060 feet; per individual, 435. Admiral's cabin, 2,172 feet; admiral's state-room, 630; total, 2,802. Captain's cabin, 1,419 feet; captain's state-room, 630; total, 2,049. Wardroom, 10,866 feet; per individual, 679. Steerage, 1,011 feet; per individual, 337.

Report of A. A. Hoehling, M. D.,

Surgeon U. S. Navy.

U. S. S. Monongahela.

HYGIENE.

Complement of officers and men, 262 when full; average during the past year, 249.50.

Viewed from a hygienic stand-point, this number appears to me to be too large. The cubic air-space allowed each individual was given in my sanitary report for 1873.

Percentage of sickness, daily, 2.81; mortality, for the year, 2.

Ventilation sufficient, except on the berth-deck, which I described in my last sanitary report. The bilge is now quite free from smell, except when the ship rolls badly. Constant cleansing and the frequent use of carbolic acid have accomplished this; the auger was applied to the obstructions which formerly prevented access to the after part of the bilge.

Lighting good in the cabin, which is provided with windows; bad in the other quarters, which have ports, with lights, 6.5 inches in diameter. There are also the usual number of hatches, but they do not add light enough to raise this ship above the ordinary standard. Her Majesty's ship Volage, now at this island, (Kerguelen,) has windows which are protected at sea with shutters containing a bull's-eye each; she has a displacement of 3,078 tons.

Warming.—Very good in all parts of the ship that are used for quarters; steam-conveying pipes are used. Those situated in the vicinity of the medical and marine store-rooms leak into those apartments, thus injuring and endangering the public property stowed there.

Water.—That distilled is pure when made in port; made when the ship rolls, it is not free from marine salts. When recent, it has the well-known "boiled-wool" taste, which would be remedied by age if we had enough tanks to keep it in unused the proper period. A filter, of the kind originally ordered for this ship, would probably diminish the flavor above mentioned. The purchased water was good at Rio de Janeiro. At Cape Town it was bad, containing too large a quantity of the marine salts. This caused some diarrhea and gastric irritation, which disappeared when distilled water was issued for use. At Three Isl-

and Harbor, Royal Sound, Kerguelen Land, we found no running water. That procured from lakelets was unfit for use, as it contained much vegetable matter, animalcules visible to the naked eye, and 15 grains of sodium chloride to the gallon. For this reason the ship was moved to Carpenter's Bay, in the vicinage. Very fair water was obtained there from mountain-streams; it contained little organic matter, and only 9.5 grains of sodium chloride to the gallon. The other marine salts did not respond to reagents. At an altitude of 600 feet I found sodium chloride in running water; above this it was not found.

On December 31 the Monongahela anchored near our transit of Venus observatory at Molloy Point, Royal Sound, Kerguelen Land. Here the water is not so good as that last described, but is quite fit for drinking purposes. It has a slightly boggy taste, contains 10 grains of sodium chloride to the gallon, but no other marine salts, and holds a little organic matter in suspension. This water we obtain from a stream; that which trickles into pools, through the dense surface-vegetation and innumerable nests of aquatic birds, is so full of organic matter as to be unfit for general use. Commander G. P. Ryan informs me that he has tried pool-water in a modified Daniells battery, and in a few minutes a white coating of organic matter covered the zinc amalgam, preventing further galvanic action. Passed Assistant Surgeon J. H. Kidder states that better water is found in the main stream at Molloy Point than we have received on board ship. Our watering-boats draw from a branch of that stream, which is more convenient, and sufficiently pure for use.

In the British navy water-tanks are now provided with filters, through which the water rises; impurities fall to the bottom, and can be removed before the tanks are refilled.

Food good in character, preparation, and quantity, excepting coffee, which has been used too freely by the crew. The

additional ration allowed by the naval appropriation bill, approved May 23, 1872, has been drawn in coffee by the crew, and, with a few exceptions, the regular ration also. This produced a number of cases of cephalalgia, nervous irregularities, hepatic irritation, and indigestion. When this effect was observed the issue was changed to equal parts of tea and coffee, with marked improvement. In my opinion it would conduce to the health of all naval crews if they were given cocoa on "first turning out," as it serves for food as well as drink, coffee only at breakfast, and tea for supper and odd occasions. When our men have been cold and wet, we have given them beef-tea with benefit. It has been highly seasoned with red pepper, and the men liked it on such occasions, though not fond of it, or of any dispensary diet when they are sick. If a bill could be made with the wardroom-mess as creditor for food supplied to the *very* sick, it would be a great advantage to the latter.

The use of tobacco was also excessive. A boatswain's mate, who was affected with sour eructations, emesis, and flatulence, used three pounds monthly, and a berth-deck cook, who has a gastric ulcer, acknowledges that he chewed two and a half pounds monthly, and states that he exchanged one and a half pounds monthly for cigarettes, as he could not smoke Navy tobacco. Many others used three pounds monthly. One pound a month is really enough for any man, but old chewers crave two pounds, and our men are now permitted to draw those quantities respectively. The men are encouraged to buy potatoes, and are allowed stowage-room for them.

Clothing good, except that the Navy caps are too low for tropical climates; the kip shoes are not durable, and the boots are too narrow in the shaft. A preservative of leather against sea-water would be a desirable addition to the stock of "small stores."

The air-ports still leak almost as badly as at the date of my

last sanitary report, (1873.) The port-frames do not fit accurately, especially at the hinges, and many of the drain-pipes are impervious. This is a damp ship; at sea the deck is almost always wet under the top-gallant forecastle and in the waist, also in the wardroom-pantry, from a leak around the rudder-head. There was a leak into the medical store-room, which injured our mattresses, but that has been stopped by calking the deck which forms the roof of the store-room. At present a leak exists at the side of the store-room, which is supposed to be due to the steam-heater pipes. The other store-rooms in the vicinage also have similar leaks. This matter will be remedied shortly. The ship sits low in the water, and rolls badly. A number of wounds, fractures, and severe contusions have resulted in consequence of this.

The berth-deck would afford more wholesome quarters for the crew if the galley-stove were moved to the spar-deck, as is the case in our smaller vessels. In this stormy, cool climate I feel the want of a sick-bay very much. At Rio de Janeiro the sick were placed under the top-gallant forecastle, but here the weather is too inclement for that; and now we place them forward on the berth-deck, where noise, impure air, the proximity of the brig, and the jogging of cots by careless shipmates must surely retard convalescence.

In order to protect the ship's company from contagion I felt it to be necessary that two men, affected with erysipelas, should be placed in a tent under the top-gallant forecastle in this climate; one died, but I trust that the severity of the disease was alone responsible for his decease.

The dispensary is too small to afford space for such duties as are usually performed in sick-bays, which apartments are to be found in nearly all foreign naval vessels of even less tonnage than this ship. Our dispensary is 6 feet 10 inches high, 6 feet 6 inches long, 3 feet 8 inches wide above the counter, and 1 foot

7 inches wide on the floor. To examine a recruit or a patient in private is almost impossible; minor surgical operations collect a gaping crowd, and in those of more importance it becomes necessary to encroach upon the space allotted to others by hanging up a muslin screen. Then it is almost unavoidable that I must operate with the patient lying upon a mattress on the deck, as the absence of a sick-bay prevented me from receiving an operating-table. The steerage dining-table is theoretically our operating-table. This would be an unexceptionable place in battle, but at ordinary sick-call it would be improper, obviously, for me to take possession of the steerage, except in performing a capital operation. The deck-light, which opens into the dispensary, was intended to hold a copper ventilator for the berth-deck, but cannot be used at present; it leaks beyond remedy, and we are obliged to hang a rubber blanket over the bottles to keep their contents dry; when this has been inadvertently omitted, medicines have been damaged. The mate of this ventilator is situated on the opposite side, and opens into the paymaster's issuing-room, where it, too, does little service in its predestined capacity. The reasons for this were given in my last annual sanitary report.

For disinfecting purposes, a larger allowance of carbolic acid and sulphate of iron would be desirable. We had the good fortune to escape the spread of yellow fever on two occasions, and of erysipelas once; the above disinfectants were used freely on each occasion. The allowance of carbolic acid in the British navy is as follows: Ships of the first and second rate, annual allowance, 120 pounds; third and fourth rate, 84 pounds; fifth rate, 60 pounds; sixth rate, 48 pounds; gun-vessels and gunboats, 24 pounds; smaller vessels, 12 pounds. In emergencies they are permitted to exceed these quantities. The acid is used on the bilges daily, and does no perceptible injury to the metals.

We have very little use for the nitrate of lead, as it acts too destructively upon the metals. Chief Engineer H. L. Snyder complained of this, and I also found the bottom of a tin slop-pail riddled by it. Following the suggestion of Surgeon F. E. Potter, who had tried the plan successfully in the United States steamer Mohican, I caused a large quantity of sulphate of iron to be emptied upon all accessible parts of our bilge when the ship was at Newport, R. I. This dissolved very gradually, and the solution probably penetrated the new wood, contributing to the present sweet condition of our bilge.

From December 22, 1873, to October 1, 1874, we spent 219 days at Rio de Janeiro, the rest of the time having been passed in short voyages for sanitary purposes. This long stay in such an unhealthy port reduced the physical tone of all in a marked degree, which even the healthy climate of Kerguelen Land has not entirely remedied.

When a well-marked case of yellow fever is reported to the commanding officer of a British naval vessel, he is authorized to leave an infected port, without waiting for other orders, by virtue of an admiralty order.

Her Majesty's store-ship Egmont, lately stationed at Rio de Janeiro, had ten cases of miasmatic fever among the crew from May 19 to June 15; eight died. A medical survey recommended that the ship be abandoned, and on June 17 officers and men proceeded to Palmeiras. All who could be spared were soon ordered to England, and the ship was condemned as unfit for further naval use.

This ship had been twelve years at Rio de Janeiro, and yellow fever had appeared on board several times. Autopsy in the cases mentioned as fatal revealed engorgement of the spleen. There was retention of urine, and in a few cases albumen was found in this excretion. In our fatal cases of yellow fever there was almost complete suppression of urine,

and the little that was removed with the catheter was loaded with albumen. In the treatment of the miasmatic fever on board of the Egmont sulphate of quinine was used in the ordinary doses, and aconite was given to reduce the pulse. We were anchored near the Egmont at this time, and from June 2 to June 9 had six cases of remittent, one of intermittent, and one of simple continued fever. We gave beef-tea and stimulants; and when the sulphate of quinine was given it was pushed until severe tinnitus aurium ensued, after which recovery was prompt. Some of the patients required ℈j thrice daily, some ℈ss thrice daily, to produce the desired effect.

Medical officers in the British navy have a fund placed in their hands with which they purchase small articles for the sick. Pleasurable exercises on shore are much indulged in by officers and men in the British navy; it would be conducive to health if we introduced the fashion more generally into our service. Bath-rooms, which we now have only in cabins, would add to health and comfort if they could be built for all on board. The "heads" and water-closets require to be radically remodeled.

It would be an improvement if a separate case were provided for silver instruments, silver and lead wire. Sometimes it is thought necessary to apply mercurial ointment to surgical instruments on damp ships. This tarnishes the metals other than steel with an amalgam, produced by the vaporization of the mercury which has been placed upon the steel contents of the case. We first used oleum theobromæ as a preservative, but it runs together and leaves spots exposed, at which the damp air acts on the steel. This was at once superseded by the ointment named above, which has been abandoned for the reason there stated. The instruments are now wiped with chamois twice a week, and I hope they will remain in the excellent condition in which Assistant Surgeon W. F. Waugh has kept them

at Rio. This ship has the new outfit of instruments, which I consider very complete.

CLIMATOLOGY.

January.—Temperature, maximum, 87° F.; minimum, 72°; average, 78°.

Barometric pressure, maximum, 30.44 inches; minimum, 29.91; average, 29.94.

Humidity, maximum, 100; minimum, 80; average, 94.

Prevailing winds, S.S.E.; force, 4.

Rain, 6th, 9 o'clock p. m. to 12 p. m.; 11th, 9 p. m. to 11 p. m.; 16th, 7 p. m. to 11 p. m.; 19th, 10 p. m. to 20th, 4 p. m.

This month was spent at Rio de Janeiro, Brazil.

February.—Temperature, maximum, 86°; minimum, 71°; average, 78°.77.

Barometric pressure, maximum, 30.24; minimum, 29.95; average, 30.07.

Humidity, maximum, 100; minimum, 72; average, 90.

Prevailing winds S.E.; force, 4.

Rain, 1st, 5 p. m., slight; 13th, 2 a. m. to 5 a. m.; 14th, 1 a. m. to 5 p. m.; 15th, 2 a. m. to 5 a. m.

The ship was at Rio de Janeiro until the 8th instant, from which date to the 16th instant we were at Ilha Grande; after that date we spent the month at Rio de Janeiro.

March.—Temperature, maximum, 87°; minimum, 70°; average, 79°.

Barometric pressure, maximum, 30.28; minimum, 29.76; average, 30.00.

Humidity, maximum, 100; minimum, 69; average, 85.

Prevailing winds, N.E.; force, 5.

Rain, 3d, 11 a. m. to 1 p. m.; 17th, 8 p. m. to 12 p. m.

The early portion of this month was passed at sea, making

the passage to and from Santa Catharina Island; the latter half we spent at Rio de Janeiro.

April.—Temperature, maximum, 85°; minimum, 68°; average, 75°.

Barometric pressure, maximum, 30.35; minimum, 29.91; average, 30.16.

Humidity, maximum, 100; minimum, 74; average, 89.

Prevailing winds, N.E. and S.E.; force, 6.

Rain, 2d, 9 p. m. to 12 p. m.; 5th, 8 p. m. to 10 p. m.; 6th, 1 a. m. to 12 m.; 7th, 7 a. m. to 8 p. m.; 8th, 9 p. m. to 12 p. m.; 9th, 12 m. to 1 p. m.; 11th, 9 a. m. to 4 p. m.; 24th, 12 m. to 12 p. m.; 25th, 10 a. m. to 11 a. m.; 26th, 2 a. m. to 5 a. m.; 27th, 5 a. m. to 12 m.

The early part of this month was spent at Rio de Janeiro, the last half mostly at Cape Frio.

May.—Temperature, maximum, 78°; minimum, 65°; average, 72°.

Barometric pressure, maximum, 30.49; minimum, 29.90; average, 30.18.

Humidity, maximum, 100; minimum, 66; average, 79.

Prevailing winds, N.W.; force, 6.

Rain, 22d, 1 a. m. to 8 a. m.; 24th, slight rain all day; 25th, 8 a. m., to 26th, 7 a. m; 27th, 2 p. m., to 28th, 9 a. m.

From the 1st to the 17th instant the ship was at Cape Frio; the remainder of the month was spent at Rio de Janeiro.

June.—Temperature, maximum, 77°; minimum, 62°; average, 68°.

Barometric pressure, maximum, 30.44; minimum, 29.97; average, 30.21.

Humidity, maximum, 100; minimum, 69; average, 94.

Prevailing winds, N.W.; force, 5.

Rain, 6th, 1 p. m. to 4 p. m.; 7th, 11 a. m. to 3 p. m.; 20th,

[illegible] 11 a. m. to 7 p. m.: 30th, 7 a. m. to [illegible]

[illegible] during the whole month.

[illegible]—Temperature, maximum, 78°; minimum, 62°; aver[illegible]

[illegible] maximum, 30.38; minimum, 30.01; av[illegible]

[illegible] maximum, 94; minimum, 68; average, 83.

[illegible]: [illegible].

[illegible] 7 a. m. to 11 a. m.: 26th, 6 p. m. to 27th, 5 a. m.

Spent most of the month at Rio de Janeiro.

[illegible]—Temperature, maximum, 76°; minimum, 62°; av[illegible]

[illegible] pressure, maximum, 30.05; minimum, 30.09; av[illegible]

[illegible], maximum, 100; minimum, 64; average, 78.

Prevailing winds, N.E.; force, 7.

Rain, 14th, 8 p. m. to 11 p. m.; 18th, 7 a. m. to 10 a. m.; 19th, [illegible] to 20th, 6 a. m.

The ship was at Santos, Brazil, on the 1st instant, and at Rio de Janeiro from the 6th instant to the end of the month.

September.—Temperature, maximum, 81°; minimum, 68°; average, 72°.

Barometric pressure, maximum, 30.44; minimum, 29.84; average, 30.20.

Humidity, maximum, 94; minimum, 63; average, 84.

Prevailing winds, N.W. and S.E.; force, 6.

Rain, 7th, 9 p. m. to 9th, 2 a. m., heavy; 25th, 9 a. m. to 2 p. m., light; 28th, 7 p. m., to 30th, 10 a. m.

Spent the month at Rio de Janeiro.

October.—Temperature, maximum, 78°; minimum, 51°; average, 60°.

Barometric pressure, maximum, 30.55; minimum, 29.53; average, 30.18.

Humidity, maximum, 100; minimum, 59; average, 82.

Prevailing winds, N.E. and N.W.; force, 2 to 6 and 11.

Rain, 10th, 5 a. m. to 10 a. m.; 15th, 8 a. m. to 7 p. m.; 16th, 10 a. m., to 17th, 6 a. m.; 20th, 2 a. m., to 21st, 7 a m.; 22d, 1 a. m. to 6 p. m.

Left Rio de Janeiro on the 1st instant for Cape Town, South Africa, where we arrived on the 29th instant.

November.—Temperature, maximum, 71°; minimum, 40°; average, 60°.5.

Barometric pressure, maximum, 30.48; minimum, 29.34; average, 30.09.

Humidity, maximum, 100; minimum, 60; average, 85.

Prevailing winds, N.W.; one S.E. gale at Cape Town; force, 2 to 7; during the gale, 10.

Rain, 8th, 11 p. m., to 9th, 1 p. m.; 28th, 7 a. m. to 10 a. m.

Left Cape Town on the 16th instant and passed the remainder of the month at sea, on the way to Possession Island, Crozette group.

December.—Temperature, maximum, 54°; minimum, 36°; average, 45°.

Barometric pressure, maximum, 30.27; minimum, 28.15; average, 29.54.

Humidity, maximum, 100; minimum, 56; average, 78.

Prevailing winds, N.W.; force, 8 to 11.

Rain, 5th, 1 a. m., to 6th, 7 a. m.; 7th, 7 p. m., to 8th, 10 a. m.; 10th, 1 a. m. to 4 a. m., a snow-squall; 12th, 8 a. m. to 12 m., passing snow-squalls; 14th, drizzling all day; 15th, snow from 8 a. m. to 1 p. m.; 16th, 8 p. m., to 17th, 7 a. m.; 18th, 4 p. m. to 6 p. m., hail, snow, and rain; 20th, 12 p. m., to 21st, 4 a. m., heavy rain; also 21st, 8 a. m. to 12 m., hail and rain; 22d, 12 p. m., to 23d, 4 a. m., snow-squalls; 26th, 11 p. m. to 12 p. m.;

29th, 2 a. m. to 4 a. m.; 30th, 2 a. m. to 11 a. m.; 31st, 2 p. m. to 4 p. m., hail and rain.

I observed no lightning while we were at Kerguelen Land during this summer-month.

On the 3d instant we arrived at Possession Island, and on the 7th instant at Kerguelen Land, where we remained the rest of the month.

MEDICAL TOPOGRAPHY.

Rio de Janeiro was described in my last sanitary report, but I will add a few facts which have come to my knowledge since then.

With regard to immunity from venereal diseases the city was overrated in that report, as subsequent experience proved. From January 8 to October 1 we had fifteen cases of syphilis and fourteen of gonorrhœa under treatment, which originated in Rio de Janeiro.

Yellow fever made its appearance on board twice in this port; one case on January 14, followed by death on the 18th, one case on March 25, resulting in death on the 28th, and a case on March 26, ending in recovery. Fortunately there was no difficulty about the admission of contagious diseases into the Santa Casa da Misericordia, and we sent our cases there without loss of time. We also used disinfectants liberally where the patients had lain, and destroyed all suspected articles. For non-contagious diseases the above-named hospital is not a desirable refuge. A British naval sailor, who was sent there with a broken leg last summer, died of yellow fever one month after his admittance. Very little provision is made for personal ablation, diet is spare, the wards are crowded, and all sorts of cases are placed together.

From February 8 to 16 we were at Ilha Grande, which island is situate sixty miles from Rio de Janeiro. This is a

sparsely-inhabited, hot, and hilly place; its only redeeming quality was the absence of yellow fever while we were there.

From March 3 to 5 we were anchored about twenty miles from Desterro, Santa Catharina Island. I did not see the town, but was informed that it possesses a good hospital, and that the island is very healthy; I saw no reason to doubt this, for the air was cool and pure, with a fine breeze stirring during our stay. The island is three hundred and sixty miles from Rio de Janeiro. Ships of 18 feet draught cannot go closer to the town than two leagues.

From April 14 to May 17 we were at Cabo Frio, sixty miles from Rio de Janeiro. This is an excellent sanitarium for vessels which have become infected at the latter place. Fresh fish, meats, vegetables, and fruits are to be had in abundance at moderate prices. The inhabitants of a contiguous fishermen's village are too few in number to poison the atmosphere with their excretions. There is plenty of room for hospital-tents; a town and post-office are situated within three leagues. A government depot for ships in distress, a light-house and signal-station, with electric telegraph, are also located here. By means of the latter we sent and received Rio de Janeiro dispatches in the English language, but the Portuguese language is generally used. Rio de Janeiro can be reached on horseback in three days. The water near our anchorage was too brackish for our use; about two leagues away, in the direction of the town of Cabo Frio, there is a reddish spring-water, with a feebly astringent taste. This is wholesome water, but there are no sufficient means of transportation. Naval vessels would not be at a loss for pure water with a distilling-apparatus on board.

From July 31 to August 1 we were at Santos, Brazil, where we made a short stay on account of an epidemic of variola prevailing there. The town has two hospitals, which contained twelve

and twenty-eight cases of variola respectively on the day of our arrival, and from which seventeen deaths were reported at the same time.

On October 1 we left Rio de Janeiro for Cape Town, arriving there on the 29th. During our sojourn erysipelas, tonsillitis, and stomatitis were epidemic, and venereal diseases prevailed extensively. We had eight cases of syphilis and seven of gonorrhœa which originated there. We also got two cases of erysipelas, nine of tonsillitis, and four of stomatitis. Summer is said to be the healthiest season here; southeast gales then prevail, and this wind is called "the Cape Doctor" by residents. Drainage is not good here, and physicians are advising the abolition of water-closets within doors. Immense numbers of a pike-like fish, called "snoek," are caught in the bay. They are cleaned and dried near the landings, creating a horrible stench.

The following-named hospitals are situate at and near Cape Town: Old Somerset, New Somerset, and Robben Island general infirmary. During the year 1873 there were admitted into the Old Somerset, lunatics and patients with delirium tremens, 37 males, 12 females; lepers, 13 males, 12 females; paupers, with chronic diseases, 89 males and 29 females; total, 192. The deaths amounted to 16 males, 26 females; total, 42; discharges, 54 males, 10 females; total, 64. The daily average of sick was 167. All surgical cases were removed to the New Somerset.

The latter is a handsome stone building, resembling a Norman castle in external appearance; it is the first structure which attracts attention on entering the harbor, and stands about one mile out of the city. All diseases are admitted, except insanity; contagiousness does not exclude a disease. During the year 1873 980 patients were under treatment—778 males, 202 females; average daily number, 97; average daily cost of each patient, 2*s.* 9*d.*; total number of deaths, 97. A

fair number of capital operations were performed with good success. The following diseases figure most prominently in the report: simple continued fever, erysipelas, rheumatism, consumption, bronchitis, pneumonia, diarrhea, dysentery, syphilis, gonorrhœa, necrosis, ulcers, and fractures.

I found the hospital very clean and comfortable; the air was pure, but the appliances for ventilation were not up to the latest standard.

During the year 1873 there were at Robben Island general infirmary a grand total of 414 patients, viz, present on January 1, 193 lunatics, 106 paupers, 38 lepers, and 2 special cases; total, 344. Admitted during the year, 28 lunatics, 25 paupers, and 17 lepers; total, 70. Of the above number 30 were discharged and 37 died, leaving 347 in the establishment on the last day of the year.

The annual cost of each patient was £31 7*s.* 0¾*d.*, the ration amounting to £17 12*s.* 1½*d.* The hospital is crowded, and needs repairs.

During the year 1873 there were 974 convicts at the various stations of Cape Colony, of whom 22 died. The cost of each convict was £30 8*s.* 6*d.*, the ration amounting to £17 15*s.* 6*d.*

On November 16 we sailed from Cape Town, and arrived at Possession Island, Crozette group, on December 3. There are no safe harbors here, and a few dilapidated remains of huts, formerly occupied by sea-elephant hunters, at Navir and American Bays, alone denote that man has ever touched these shores. The animals and vegetables appeared to be identical with those I afterward observed at Kerguelen Land; the sea-elephants were more numerous.

We left the island on the afternoon of the day of our arrival, without having found the transit of Venus party whom we sought.

On December 7 we arrived at Christmas Harbor, and on the

9th at Three Island Harbor, Royal Sound, Kerguelen Land. The former place is very stormy, and the latter is only a little less so. We are now (January 1, 1875,) anchored off the United States transit of Venus observatory at Molloy Point, Royal Sound. The climate is cool and healthy. The only disease which it appears to cause often is rheumatism.

Kerguelen cabbage (*Pringlea antiscorbutica*) is equal in flavor to our domestic cabbage if boiled in three waters, or if the young leaves are made into a salad. It is slightly stimulating and pungent when raw, the old leaves have a slightly bitter taste, and the plant contains a volatile oil, which renders it less apt to disagree with weak stomachs than our own cabbage. The stalk is often boiled and mashed, to be eaten as a substitute for turnips, and whalers pickle the leaves with vinegar, making a sort of "sauerkraut," which they use on their voyages. Other antiscorbutics growing here are a pepper-grass, (*Ranunculus crassipes*,) and the root of *Azorella selago*, used by whalers; this plant carpets the land, and is called "moss" by the whalers, on account of the appearance given by its densely-packed leaves. The root is said to have a sweetish taste. Teal-ducks are abundant and delicious. The chionis, a white bird resembling our domestic pigeon, not web-footed, and a feeder on other birds' eggs, &c., makes a palatable pot-pie, as our mess can testify. The eggs of a small variety of penguin, called rock-hopper, (*Endyptes chrysocome*,) are edible. Muscles are plentiful, and make wholesome food, either fried, stewed, roasted, or pickled.

The whalers tell me that their chief indigenous medicine is an infusion of Kerguelen tea, (*Acæna ascendens*,) which cures their colds, and is used as a panacea; it probably acts as a diaphoretic. They also tried a tea made of cotton-leaf, (*Leptinella plumosa*;) this caused severe vomiting, and was not again taken.

Her Majesty's ship Volage has landed some goats and rabbits

here, and the German naval ship Gazelle will leave some goats. There are many rabbits on Hog and Possession Islands, Crozette group, but their flesh is said to be coarse and rather unpalatable. Hogs left to feed on the islands about Kerguelen Land soon become unfit to be eaten for the time being, as their flesh acquires a rank, fishy taste; they probably feed on shell-fish, sea-birds, and bitter roots. We have found very few fish here in the harbors.

Report of J. A. Hawke, M. D.,

Passed Assistant Surgeon U. S. Navy.

U. S. S. Wasp.

HYGIENE.

Most of the facts under the head of "Hygiene" were given in my report of last year, so it is unnecessary to recapitulate them here.

The average number of ship's company for the year, as exhibited by the quarterly reports, was 74, and the proportion of cases admitted to the whole number of persons on board ship is 1.16, or each person was on the sick-list 1.16 times during the year. The percentage of deaths to the whole number of cases treated is .011.

CLIMATOLOGY.

The meteorological register, in monthly forms, as prescribed by the Bureau, is herewith inclosed. The blanks under the heading of "Thermometer attached" have been filled up, but the variation is so slight, as compared with the other thermometer, that I think the figures should be rejected as inaccurate.

During the past year we have been stationed the greater part of the time at this port (Montevideo.) The other places visited

have been Colonia, Uruguay, Buenos Ayres, Rosario, Corrientes, and La Paz, Argentine Confederation, and Ascencion, Paraguay.

At Colonia we remained but a few hours.

Buenos Ayres was visited twice, remaining two or three weeks on each occasion. Owing to the state of siege and the restricted communications, I had no opportunity of visiting any of the hospitals of that city.

On December 3 we sailed for Ascencion, Paraguay, a distance of four hundred leagues, where we remained about a week, returning December 22. The other places mentioned, viz, Rosario, Corrientes, and La Paz, were ports at which we touched during the passage, for the purpose of getting fresh supplies. At none of them did we remain more than a few hours.

At Ascencion I endeavored to get some statistics of disease, mortality, &c., but was informed by the authorities that none had been published for several years. In conversation I learned that the most prevalent diseases are phthisis, pneumonia, syphilis, and those common to the tropical realm in general, viz, malarious fevers, diarrhea, dysentery, hepatic affections, and their results. The population of the city is probably from ten to twelve thousand. A noticeable feature since the late war is the great excess of females, which, throughout the entire republic, is said to be very large. In the absence of a census, the exact proportion cannot be determined, but by those best qualified to judge it is estimated that in the camp and country villages the proportion rates as five to one, while in the city of Ascension it is thought to be not less than three to one. The cause, as intimated, is justly attributed to the great loss of life incurred during the war, which history has already recorded as one of the most heroic struggles of the age.

The city presents a neglected and dilapidated appearance; the streets are irregular and dirty, imperfectly lighted, and badly paved. The people are greatly impoverished, and, with

the bad sanitary conditions by which they are surrounded, the rate of mortality must be very large. There is no drainage other than that effected by the natural conformation of the soil. Among the lower orders syphilis is said to be very common. A few days after leaving we had six cases of gonorrhœa under treatment, and two of primary syphilis. During the previous eleven months there had been only one case of each.

The health of Montevideo has been good, and the death-rate I think will compare favorably with the other cities of the world. In my last report I stated there has been no epidemic influence during the year. I have since discovered that this was an error, as yellow fever had existed for a few months in the beginning of the year, previous to my arrival on the station.

I subjoin the following table, derived from an official source, giving the mortality in the department of Montevideo from 1860 to 1873, inclusive, a period of fourteen years:

Years.	Montevideo, Cordon, and Aguada.	Reducto, Union, Cerro, and Paso de Molino.	Total.
1860	1,470	203	1,673
1861	1,443	202	1,645
1862	1,543	334	1,877
1863	1,874	403	2,277
1864	1,825	477	2,302
1865	2,875	530	3,405
1866	2,836	384	3,220
1867	2,460	423	2,883
1868	4,539	1,054	5,593
1869	2,553	424	2,977
1870	2,544	515	3,059
1871	3,646	734	4,380
1872	2,946	696	3,642
1873	3,094	575	3,669
Total in 14 years	35,648	6,954	42,602

NOTE.—In 1868, cholera prevailed; in 1871, small-pox; and in 1872-'73, yellow fever.

The following tables, extracted from a report made by Señor Don Adolfo Vaillant, show the comparative mortality of males

and females, natives and foreigners, &c., during the same period:

TABLE No. 1.—*First quinquennium, from* 1860 *to* 1864 *inclusive.*

	1860.	1861.	1862.	1863.	1864.	General average.
Males	992	1,043	1,107	1,294	1,358	1,159
Females	681	602	770	983	944	796
Natives	1,049	1,009	1,231	1,558	1,554	1,280
Foreigners*	624	636	646	719	748	675
Unmarried	423	431	432	465	529	460
Children†	795	761	950	1,212	1,175	979
Married, widowers, and widows	455	453	495	580	598	516
White	1,341	1,343	1,537	1,930	1,956	1,622
Colored	332	302	340	347	346	333
Under two years	613	604	774	841	935	754
Two years and upward	1,060	1,041	1,103	1,436	1,367	1,201
Totals	1,673	1,645	1,877	2,277	2,302	1,955

* The deaths not classified are equally divided among natives and foreigners.

† Includes males under 14 years and females under 12 years.

TABLE No. 2.—*Second quinquennium, from* 1865 *to* 1869 *inclusive.*

	1865.	1866.	1867.	1868.	1869.	General average.
Males	2,195	2,180	1,865	3,545	1,856	2,328
Females	1,210	1,040	1,018	2,048	1,121	1,287
Natives	2,010	1,656	1,640	2,953	1,911	2,034
Foreigners*	1,395	1,564	1,243	2,640	1,066	1,581
Unmarried	1,074	1,205	770	1,316	646	1,002
Children	1,636	1,250	1,297	1,896	1,553	1,526
Married, widowers, and widows	629	711	721	1,646	717	885
Unknown†	66	54	95	735	61	202
White	2,507	2,369	2,386	5,014	2,725	3,000
Colored	898	851	497	570	252	615
Under two years	1,132	923	995	1,286	1,287	1,124
Two years and upward	2,273	2,297	1,888	4,307	1,690	2,491
Totals	3,405	3,220	2,883	5,593	2,977	3,615
Victims of cholera included	.....	.....	.....	1,947	.....	.....

* There are 504 deaths whose nationality is unknown, and they are divided equally among natives and foreigners.

† The large number of deaths not classified in 1868, on account of the haste with which the interments were made during the cholera, changes considerably the general average of this quinquennium.

TABLE No. 3.—*Mortality, compared, from* 1870 *to* 1873 *inclusive.*

	1870.	1871.	1872.	1873.	General average.
Males	1,919	2,596	2,133	2,254	2,225
Females	1,140	1,784	1,509	1,415	1,462
Natives	1,984	2,985	2,408	2,166	2,386
Foreigners	1,020	1,345	1,194	1,442	1,250
Unknown	55	50	40	61	51
Unmarried	623	869	735	764	748
Married	491	695	623	715	631
Widowers and widows	205	210	224	301	235
Children	1,644	2,515	1,994	1,792	1,986
Unknown	96	91	66	97	87
White	2,783	4,062	3,424	3,474	3,443
Colored	276	288	218	195	244
Total	3,059	4,380	3,642	3,669	3,687
Including deaths from small-pox	.....	1,277	382	134	.....
Including deaths from yellow fever	.....	.....	142	335	.....

In another table, embracing reports for the years 1870 to 1874, inclusive, it is shown that the rate of mortality follows no fixed and absolute law, as in many parts, but presents notable differences in the same months and seasons, which is attributed by the writer to the variations of temperature experienced in all seasons of the year.

As the report is an interesting one, I append a translation of a few of the more important points.

The census of the year 1860 shows 1 death to each group of 34.58 inhabitants, or of 28.91 deaths for each thousand inhabitants. In Buenos Ayres the mortality of the year 1869, compared with the census, gives 1 death in 36.74 inhabitants, or 27.74 deaths for each thousand inhabitants. In Valparaiso, Chili, the proportion of mortality is 1 death in 26, and in Santiago, Chili, 1 in 37. In Montevideo, the proportion of deaths during the past fourteen years has been 6 males to 4 females. "This disproportion," adds the writer, "is due to the European immigration, which is composed largely of males."

"The average of the fourteen years is the same, in relation to

the sexes, to that presented in the year 1873, and almost equal in respect to the two grand divisions of natives and foreigners; but we note with regret that the last period, from 1870 to 1873, is that which presents the greatest mortality among children under two years of age.

"In the first quinquennium the proportion is 38 per cent., in the second 31 per cent., and in the last period increases again to more than 40 per cent. In the average, more than a third part of the mortality falls upon those under two years of age. In France, the mortality of those under two years reaches to the fifth part—no more. In Chili, the percentage of deaths of those under seven years of age, compared with the general mortality for ten years previous to 1872, reached 60 per cent."

The deaths from phthisis are classified as follows: Males, 183, (proportion, 65.3 per cent.;) females, 97, (proportion, 34.7 per cent.;) total, 280; of which 16 were under 10 years of age, 22 from 11 to 18, 70 from 19 to 25, 95 from 26 to 40, 57 from 41 to 60, 20 unknown; natives, 108, (proportion, 38.5 per cent.;) foreigners, 172, (proportion, 61.2 per cent.)

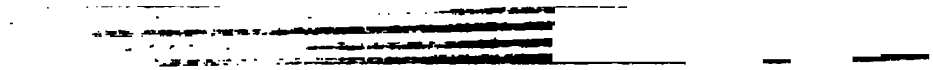
The great mortality from this disease among foreigners is attributed by Dr. Wonner to the variations of climate, to which they are more susceptible than the natives.

The population of Montevideo is estimated to be about 120,000, of which 50,000 are foreigners and 70,000 natives.

The medical statistics are still very imperfect. Dr. Wonner, who has been diligently striving for reform in this direction, gives the following table of mortality for the years 1871 and 1873: "From which it appears that in the year 1871 there were 1,440 deaths, and in the year 1873, 1,073 deaths, of the cause of which we are ignorant—almost the third part."

Mortality according to diseases.

Diseases.	1871.	1873.
Yellow fever	.....	335
Consumption	251	280
Still-born	120	210
Bronchitis	99	139
Small-pox	1,087	134
Inflammation of bowels	70	118
Meningitis and hydrocephalus	67	110
Typhus and typhoid fever	62	93
Aneurism and organic disease of heart	54	89
Inflammation of stomach and bowels	67	75
Apoplexy	72	73
Wounds	110	61
Diphtheria and croup	92	61
Cancer and cirrhosis	9	39
Inflammation of liver	27	36
Dropsy	14	36
Convulsions, (children's)	16	35
Violent lesions and sudden deaths	22	33
Gangrene	12	31
Dysentery and diarrhea	22	26
Catarrh	21	18
Hooping-cough	12	9
Enlargement of heart	.....	4
Syphilis	12	11
Rheumatism	11	9
Scrofula	8	12
Suicide	.....	10
Paralysis	12	13
Asthma and angina pectoris	8	7
Dementia	2	8
Delirium tremens	4	6
Softening of brain	3	11
Myelitis	2	2
Other diseases	572	463
Deaths from classified diseases	2,940	2,596
Deaths without medical certificate	1,440	1,073
Total mortality	4,380	3,669



SANITARY REPORTS.

ASIATIC SQUADRON.

1874.

ASIATIC SQUADRON,

1874.

REPORT OF THOMAS W. LEACH, M. D., U. S. N.,
Surgeon of the Fleet.

FLAG-SHIP HARTFORD.

HYGIENE.

The complement of officers and men and the percentage of sickness and mortality have been as follows: Average number on board during the year 1874, 412; remaining sick December 31, 1873, 16; admitted in 1874, 307; discharged to duty in 1874, 271; discharged from service in 1874, 1; transferred in 1874, 29; died in 1874, 5; remaining sick December 31, 1874, 17; total treated in 1874, 323; daily average of patients, $13\frac{325}{365}$; percentage of cases to number of persons on board, 0.783; of deaths to number of persons on board, 0.0121; to number of cases treated, 0.0154.

Ventilation, lighting, and warming were fully reported upon in sanitary report for the year 1873.

Water.—Distilled water has been used throughout the year with the best results.

Food.—For eleven months in the year fresh beef and vegetables have been served out to the crew as often as four times each week.

Clothing.—Clothing has for the most part been obtained from native tailors. Price and quality compared very favorably with those of Government issues.

The following table exhibits the cases treated, classified under the usual heads:

Tabular statement of cases treated in 1874.

Diseases.	Remaining from 1873.	Admitted in 1874.	Discharged to duty in 1874.	Discharged from service and deserted in 1874.	Transferred in 1874.	Died in 1874.	Continued to 1875.
Class I. Zymotic diseases:							
Order I. Miasmatic diseases	3	23	26	.....	.....	.....	.....
II. Enthetic diseases	2	42	34	.....	1	.....	9
Class II. Constitutional diseases:							
Order I. Diathetic diseases	1	13	12	.....	2	.....	.....
Class III. Parasitic diseases	.....	1	.....	.....	1	.....	.....
Class IV. Local diseases:							
Order I. Diseases of the nervous system	.....	7	5	.....	2	.....	.....
II. Diseases of the eye	.....	3	3	.....	.....	.....	.....
V. Diseases of the circulatory system	.....	9	3	1	4	1	.....
VI. Diseases of the respiratory system	2	26	21	.....	5	2	.....
VII. Diseases of the digestive system	2	72	63	.....	9	1	1
VIII. Diseases of the urinary and genital system	.....	25	17	.....	3	.....	5
IX. Diseases of the locomotive system	.....	5	4	.....	.....	.....	1
X. Diseases of the integumentary system	5	48	52	.....	1	.....	.....
Class V. Non-malignant tumors and cysts	.....	1	1	.....	.....	.....	.....
Class VI. Violent diseases and deaths:							
Order I. Wounds, injuries, and accidents	1	32	30	.....	1	1	1
Total	16	307	271	1	29	5	17

MEDICAL TOPOGRAPHY.

The medical topography of places visited by this vessel during the year has already been given in the sanitary report for the year 1873.

REPORT OF W. K. SCOFIELD, M. D.,
Surgeon U. S. Navy.

U. S. S. LACKAWANNA.

HYGIENE.*

* * * * * * *

During the year 163 patients have been treated, of whom 6 have been sent to hospital. The remainder have been restored to duty. One death by drowning has occurred.

Ventilation.—The ventilation is good; the ship has always been free from bilge odors. On the berth-deck are fourteen air-ports, including the two in the sick-bay, each 6½ inches in diameter. These are open most of the time in mild weather; in winter they are kept closed, in order to prevent the heat of the galley from escaping. The galley-fire furnishes all the heat given to the berth-deck; the steam-heating apparatus is furnished to the wardroom, steerage, and cabin. There are three hatches for the berth-deck; forward hatch measures 7 feet by 5, the middle hatch 6 feet by 4, the after hatch is 8 feet by 6. There is also a galley-hatch, allowing much of the heat of the galley to escape when required. In summer-time the open door between the berth-deck and the fire-room affords additional means of ventilation.

Lighting.—The means of lighting the berth-deck are sufficient, consisting of the air-ports and hatches mentioned.

Water.—The water in general use upon the bluff at Yokohama and by most of the merchant-ships in harbor, as shown by chemical analysis, contains chloride of sodium, sulphate of lime, and chloride of magnesium, 13 grains to the gallon. That in use until last month on board the Lackawanna contains a less proportion of salts, owing to admixture with surface-drainage

* See report of Dr. Scofield for 1873.

from the valley to the westward of Yokohama. That at present used is obtained from the Kawasaki River fresh every third day.

Food.—The ration is abundant and of good quality—fresh beef and vegetables four times a week. The supply has been regular during the past year, owing to the fact that the ship has been in port, where fresh supplies could be had, for 327 days, viz, at Nagasaki, 116 days; at Shanghai, 21 days; at Hong-Kong, 10 days; at Yokohama, 180 days.

Clothing.—Clothing has been supplied chiefly by Chinese and Japanese tailors, and consists of a cheap sort of woolen goods.

CLIMATOLOGY.

A synopsis of the meteorological report for the year is given, as calculated from observations made at the United States Naval Hospital, Yokohama, Japan.

Table of monthly meteorological observations for the year ending December 31, 1874.

Months	Temperature, F.			Atmospheric pressure.				Rain-fall.
	Max.	Min.	Mean.	6 a. m.	9 a. m.	3 p. m.	9 p. m.	Inches.
[illegible]	4[illegible]	35	39	30.11	30.12	30.08	30.11	1.90
[illegible]	4[illegible]	38	41	30.10	30.11	30.07	30.10	1.58
[illegible]	5[illegible]	43	46	30.00	30.11	30.08	30.09	7.12
[illegible]	[illegible]	51	55.5	30.05	30.05	30.05	30.03	1.[illegible]
[illegible]	[illegible]	58	62.5	30.05	30.05	30.03	30.04	6.57
[illegible]	[illegible]	[illegible]	73	30.03	30.04	30.03	30.03	7.04
[illegible]	[illegible]	[illegible]	76	30.02	30.03	30.04	30.03	6.49
[illegible]	[illegible]	[illegible]	79	30.05	30.06	30.04	30.04	3.91
[illegible]	[illegible]	[illegible]	71	30.04	30.05	30.04	30.07	7.44
[illegible]	[illegible]	[illegible]	56.1	30.11	30.13	30.11	30.13	10.54
[illegible]	[illegible]	[illegible]	46.75	30.15	30.16	30.13	30.15	1.94
[illegible]	[illegible]	[illegible]	45.75	30.11	29.96	29.96	30.00	5.40
[illegible]	[illegible]	[illegible]	57	30.07	30.05	30.05	30.07	63.12

MEDICAL TOPOGRAPHY.

Japan in general has the superior advantages of a moderate temperature during the summer months and absence of bleak winds during the winter. The mean annual temperature in the

southern part of Japan is 58° F.; that for winter being 43°; spring, 55°; summer, 76°; autumn, 59°.

There is no injurious wind, and the sick, who cannot bear a dry, irritating air, but need a mild, soft, and relaxing atmosphere, will find it here. Laryngeal, bronchial, and pulmonary diseases are soothed and benefited when subjected to its influence.

In the winter-season variola prevails. This winter, *for the first time*, the Japanese authorities have made vaccination compulsory. Last fall typhoid fever occurred largely among the younger class of Japanese in the schools at Yedo. I have lately observed a case of typhoid fever in which there was no diarrhea present, and my able *confrère*, Assistant Surgeon Black, reports that Dr. Jamison, a practitioner of large experience in Shanghai, informed him that cases of typhoid fever, without abdominal symptoms, were very common in the east.

There are twelve hospitals for natives in Japan, in charge of American, German, English, and Dutch physicians.

The Japanese medical students at Yokohama hospital have had permission granted them recently by the government to use the first cadaver for dissection. The students have much energy, and spare no labor in the pursuit of knowledge under difficulties. I have witnessed the knowledge of details they display when questioned on anatomical subjects.

In the neighborhood of Yokohama, in the vicinity of Fujiyama, are numerous springs, which are tonic, laxative, and alterative. Japan abounds in thermal sulphurous springs. Those most resorted to by foreigners are situated on a plateau 1,500 feet above the sea in the district of Ashinoyou. These have a temperature of 120° F.; those in the province of Hizen, island of Kiousou, visited last year, at an altitude of 2,200 feet, have a temperature of 204°, the boiling-point. They are efficacious, and are largely used by the Japanese in chronic skin-diseases, syphilitic affections, stiffness of limbs after disloca-

tion and fractures, in old ulcers, chronic bronchitis, rheumatism, and neuralgia.

Dr. Savatier, of Yokoska, near Yokohama, a French physician and naturalist, is doing more than any one else in developing the flora of Japan, having enriched it by the discovery of a considerable number of species; and through his kindness and assistance I had the pleasure of visiting his herbal collection at Yokoska. The herbarium is well arranged; and, with so large a number of specimens in it, it is easy to compare many species together, and to show, at a glance, the different characters which they present. The drying is done slowly, by means of sunlight and artificial heat. In so damp a climate Dr. Savatier has succeeded well in preserving his specimens.

For preservation, when dried, specimens are placed between white loose-textured paper, of quarto size, prepared with bichloride of mercury to prevent attacks of insects. The colors of the various stalks, leaves, and flowers are well preserved. Here are collected eighty-six species of ferns common to Japan.

During the last seven years Savatier has added to the species already known, five to the *Ranunculaceæ*, eight to the *Geraniaceæ*, six to the *Leguminosæ*, several to the *Umbelliferæ*, and one to the *Hamamelideæ*. The last named, the doctor states, constitutes another link between the flora of Japan and that of the northwest of America. To the great family of *Compositæ* he has discovered and named fourteen additional kinds; to the *Gentianæ*, a new species called *Gentianæ nikœnsis*, which grows very high. He has added seventeen species to the *Carex*, of which Japan reckons seventy-three species.

A certain number of species in Japan are common to the temperate regions of Europe, Asia, and America.

About one-half of the flora of Japan is indigenous, although it is probable this proportion will be diminished when the coasts of Northern China, Corea, and Manchuria are better known.

Savatier informed me that he has nearly ready for publication in Paris his work on the flora of Japan, in two volumes of a thousand pages, entitled "Enumeratio plantarum in Japonia crescentium."

REPORT OF C. H. WHITE, M. D,

Surgeon U. S. Navy.

U. S. S. MONOCACY.

HYGIENE.

For complement of officers and men and cubic air-space allowed each individual on board, see sanitary report for 1873.

Percentage of sickness, 0.031; mortality, 13.3 per thousand.

For ventilation and light, see sanitary report for 1873.

Warming.—The cabin is warmed by a grate, and the ward-room and berth-deck by stoves. The steerage and chart-room have steam-pipes that can be used when fires are lighted in the furnaces. By these means the ship is rendered sufficiently comfortable in any weather we have on this coast.

Water.—Distilled water has been used throughout the year on board, except on two occasions, when repairs to the distilling-apparatus interfered with distillation.

Food.—On an average, the crew has been supplied with fresh meat, fresh vegetables, and fresh bread, two and a half times a week, during the year.

Clothing.—Very many men will not wear, through the summer or in the tropics, the heavy blue regulation undershirts that are furnished to them. If compelled to put them on at quarters they will remove them as soon as the opportunity

offers, and they are sure to sleep on deck without them at night. Furthermore, their dark color is an objection to them, especially during warm weather, when, saturated as they become by perspiration and other effete products of the body, it conceals their condition, from the eye at least, and so they are not uncommonly worn for weeks unchanged. As a remedy for these two difficulties, I have to suggest that a white undershirt, of some material like merino or light flannel, be furnished the men. The woven merino shirts would probably give better satisfaction than any other kind, fitting, as they do, neatly, especially about the neck, and being withal cheap.

SAIGON, COCHIN-CHINA.

Saigon is situated in latitude 10° 17′ north and longitude 107° 4′ east, on the Donai River, about sixty miles from the sea. The country about is one vast plain, covered with jungle, and is cut up by a net-work of rivers that discharge their waters into the sea through numerous mouths. Cape St. James, at the mouth of the Donai, is about 900 feet high, and extending northward from it, forming a coast-line, is a range of hills, called "The Barriers." On one of these hills the French erected a few years ago, at great expense, a sanitarium, intended especially for the benefit of the soldiers debilitated by service in the low and malarial districts where they were campaigning. They were obliged to abandon the place, however, on account of the numerous tigers that abound in the vicinity. They could not keep the place supplied with provisions, the tigers killing off so many of the coolies that at length no one could be found to undertake the carrying-trade between Cape St. James and the sanitarium.

There is a small village at Cape St. James, where invalids from Saigon frequently resort for their health.

Saigon and its suburb, Cholon, have about 5,000 French in-

habitants, besides a numerous Chinese and Annamese population. The winter-season is the dry season, but with the change of the monsoon, in March or April, the rain comes on, and then the hot weather follows. The season succeeding the rain, when the water is subsiding from the vast swamp, into which the country around Saigon is converted by the overflow of the numerous rivers, is the sickly season. Malarial fevers and bowel affections are the prevailing forms of disease. Acute dysentery is the most frequent cause of death among the foreign population. Hepatic complaints frequently complicate intestinal affections. One case of remittent fever and seven cases of intermittent fever occurred on board the Monocacy soon after leaving this port.

Dengue appeared here for the first time in June, 1873. A great many people suffered from it, but no deaths were attributed to it. The epidemic lasted about three months, and then ceased. Persons affected suffered usually ten days or two weeks.

Cholera has visited Saigon, but I could obtain no statistics as to the frequency or extent of the visitations.

Syphilis is said to prevail extensively among the Annamese and Chinese.

The mosquitoes here are very troublesome, and their bites are uncommonly poisonous. It is said that a whole company of French soldiers, while campaigning in a neighboring district, died from an irritative fever induced by the bite of this insect.

Water.—Owing to a leak in the condensing-apparatus on board, it became necessary to get water from the shore on our arrival here. It was furnished us by the French government water-boats, and was free from any large amount of deleterious matter. It contained a little lime and some chloride of sodium, without an apparent trace of organic matter. A specimen furnished by the Chinese *comprador* was totally unfit for use.

BANGKOK, SIAM.

Bangkok, the capital city of Siam, is situated on the Meinam River, about twenty-five miles from its mouth, in latitude 14° 55′ north, longitude 100° east. The surrounding country is low and flat everywhere, and covered by a luxuriant tropical vegetation. Here and there along the river are extensive paddy or rice fields, which are covered by water during the rainy season, and being always exposed to a torrid heat, the most favorable conditions exist for the development of malarial poison. Under such favorable conditions a most active poison is generated, and intermittent fever and bilious remittent fever (called here jungle-fever) of a severe type are common. This jungle-fever, during some seasons, is characterized by such severity in its attack and course, and by such fatality in its termination, that it is scarcely distinguishable from yellow fever, save by the accident of black-vomit. Acute and chronic dysentery are always prevalent here, and are the causes of the greater number of deaths, taking all seasons into account.

Cholera has three times visited Bangkok; first, in 1820, in June and July; second, in 1849, in June and July; third, in 1873, in June and July.

In 1820 the disease first appeared in the Malayan Peninsula and the islands off the coast of Siam, approaching by steps to Bangkok. It was estimated that in and around this city alone 100,000 people perished during this epidemic. After this visitation the disease did not wholly leave the country, but every year a few cases appeared in some localities.

In 1849, it is estimated that 30,000 deaths occurred in and about the city. In one day 696 deaths were reported at the different *watts* or temples.

In 1873, the largest death-list was on the 30th of June, when 545 deaths were officially reported. The whole number of

deaths reported during this epidemic was 6,660, of which 4,051 were males and 2,609 were females.

The epidemic of last year (1873) seemed likely to be followed by another and more severe one the present season. Numerous cases had already appeared when we left the place, (February 26,) and so early an appearance was a serious augury for the coming summer.

From these epidemics the lower classes, living in crowded and filthy streets, have been the chief sufferers. The nobility have scarcely suffered at all; and the lower classes that live in the floating houses on the river are exempt from its severe ravages.

Small-pox occasionally is epidemic here. The last time was in the winter of 1870 and 1871.

Rubeola was epidemic in 1872 and 1873.

Eczema, of a severe type, prevails here among the foreigners and the natives. So intense is the suffering from the intolerable itching, and so little benefit accrues from the use of any known medicament, that foreigners are not unfrequently obliged to take a sea-voyage in order to obtain relief.

Goitre is occasionally seen here, but whether it originates here, or in some of the interior districts, I was unable to determine. In the provinces lying to the northward of Bangkok this disease is known to prevail extensively,

M. Henri Mouhot, a French naturalist, is his "Travels in the central parts of Indo-China, Cambodia, and Laos," speaking of Paklaie, (latitude 19° 16′ 58″,) on the Mekon River, says: "As among the Grisons, or the mountains of Valais, the whole population, from Dong Phya Phai to this district, who drink the water of the mountain-rivulets, are disfigured by immense goitres." Of the Laotians, he says: "The women, at an advanced age, with their immense goitres, which they admire, are repulsively ugly." Of Bane-Nakhau, in Laos, he says: "Here

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all the women have goitres, often enormous and most repulsive. Even young girls of nine or ten are to be seen with them, but rarely the men."

The other diseases most commonly met with in Bangkok are acute and chronic hepatitis, syphilis, elephantiasis arabum, calculus, diarrhea, and phthisis.

Although dogs are innumerable here, still hydrophobia is rarely seen. A writer in the Bangkok Recorder for 1866 says: "We, who have been here more than thirty years, and much of the time in large medical practice, do not recollect of having seen more than two cases, nor to have heard of more than a dozen occurring in Bangkok during all that time."

From data obtained from the Bangkok Calendar for 1873, I have made the following meteorological table:

1873.	Temperature.		Rain.		Winds.	Weather, &c.
	Mean.	Extremes.	Inches.	No. days.		
January ...	78°.19	54°-99°	0.16	1	N., S., S. W.....	Fine, healthy.
February ..	79 .89	56 -92	0.46	4	N. E., E., S. S. E ..	Showers.
March	83 .41	68 -97	1.49	5	E. N. E., S. S. W..	Growing hot.
April	83 74	70 -97	4.08	9	N. E., S. W.....	Hottest month.
May	83 .37	73 -97	9.25	19	S., S. S. W., S. W..	Rainy season.
June.....	82 .69	74 -95	8.03	18	S., S. W., W.....	Malarial fevers.
July	82 .00	73 -96	7.02	18	S., S. W	Pleasant showers.
August	81 .85	72 -96	7.13	18	S., S. W	Pleasant showers.
September.	81 .19	73 -94	12.32	20	W. S. W., N. W., S.	The wettest month.
October....	80 .64	70 -93	7.14	16	W. N. W., E. S. E., W	River overflows.
November .	78 .74	63 -90	3.34	8	N. E	Dry and bracing.
December..	76 .56	60 -91	0.15	4	N. E., S. S. E., S...	Showers.

Total amount of rain during the year, 60.57 inches; total number of rainy days during the year, 140.

April is an unhealthy month, dysentery prevailing among foreigners.

In June, jungle-fever prevails in the wooded rural districts, but need not be feared by people living in the city, who do not expose themselves by journeys into the country at this season.

In November, the northeast monsoon commences, and brings a dry, bracing air. Catarrhal complaints are frequent, but are not usually of a serious character.

December and the two succeeding months are pleasant and healthy. It is at this season that journeys to Ayuthia and other distant places of interest should be made.

Water.—The water used here is rain or river water, filtered. None was received on board.

SINGAPORE.

Singapore, in latitude 1° 17′ north, longitude 103° 50′ east, enjoys a very even temperature, and the climate, considering the tropical position of the place, is wonderfully healthy. Situated so near the headquarters of cholera, it receives occasional visitations from that disease. Last year (1873) there were two separate epidemics of cholera here. The first one came early in the season, from India, in its old track, and then spread to the southward and eastward, to Sumatra, Borneo, and Java. It spread among both the Dutch and Achinese forces, causing a suspension of hostilities, and rendering both parties helpless for a time. While the disease was at its height there among the islands it seemed to have nearly abandoned Singapore, a few cases only appearing here and there. But suddenly it returned again, and raged with considerable violence among the Chinese and Indian population, very few Europeans suffering during this second epidemic.

I could obtain no estimate worthy of record of the number that died here from this disease last year.

Dengue appeared here for the first time in the early part of 1872. It is certainly singular that a disease so common in tropical America has never before touched this coast, and its eventual appearance is the more noteworthy, as it demonstrates that, all circumstances being favorable to its existence, a special ferment is required to establish the disease. Whence this ferment came to Singapore is not known, but that it was conveyed hither by some vessel is rendered unquestionable by the fact

that it spread from this place in the direct routes of commercial intercourse.

Malaria, giving rise to both intermittent and remittent fevers, is nearly everywhere present on the island of Singapore. In the city itself the poison is not particularly active, but it is strong enough to impress a malarial character on other diseases.

The report from the civil hospital for the year 1872 classifies the diseases treated there as follows:

	Admitted.	Died.
GENERAL DISEASES.		
Febrile group	172	1
Constitutional group	159	3
LOCAL DISEASES.		
Nervous system	39	1
Eye	5	.....
Ear	2	.....
Nose	2	.....
Respiratory system	28	1
Digestive system	134	11
Urinary system	34	1
Generative system	16	.....
Organs of locomotion	12	.....
Cellular tissue	13	2
Cutaneous	59	2
Debility	30	2
Poison	13	.....
Injuries	327	13
Surgical operations	6	.....
Total	1,051	37

No cases of the following diseases were admitted during the year: Yellow fever, plague, typhus, small-pox, scarlatina, typhoid fever, erysipelas, or pyæmia.

Water.—The water furnished shipping here is not good. It is nearly free from salts of all kinds, but it contains a very appreciable quantity of organic matter. Many of the people on shore use filtered rain-water.

MANILA.

Manila, on the island of Luzon, is in latitude 14° 36′ north, longitude 120° 53′ east. It has a population of 100,000, about

5,000 being Europeans. The city is situated on a level plain, but slightly raised above the level of the sea.

Manila has no medical literature that I could find. Dr. Richard Burk kindly furnished me with a few notes relative to the diseases most prevalent here.

Occasional cases of typhus fever occur, typhoid being quite common. Malarial fevers, intermittent and remittent, prevail. From 1863 to 1868 cases of cholera were of continual occurrence. Small-pox always prevails among the natives. There is a law to enforce vaccination, but it is not generally observed.

Elephantiasis arabum and leprosy are not unfrequent. Phthisis, dysentery, and diarrhea abound everywhere and always.

Syphilis prevails here as in all other sea-port towns. Very stringent laws exist here against prostitution, and women detected in violation of them are immediately banished from the city.

HOSPITALS.

The hospital of San Juan de Dios receives all classes of patients. The foreign patients, other than Spanish, are attended to by Drs. John and Richard Burk.

There is a military hospital for the soldiers. San José Hospicio is a charitable institution for the accommodation of the poor and of lunatics.

There is an asylum for lepers, under charge of the Franciscan monks.

Water.—The water furnished to ships is obtained from the river, and is objectionable on account of the organic matter present.

HONG-KONG.

This island is of volcanic origin, and situated at the mouth of the Canton River, in latitude 22° north and longitude 114° east.

The colony is watched over by a board of health, composed

of a colonial surgeon and inspector of hospitals; a health-officer of the port; an inspector of nuisances; an inspector of brothels.

The hospitals are four in number, viz, the Government Civil Hospital; the Lock-Hospital; the Foundling-Hospital; the Royal Naval Hospital.

During the winter and spring months the climate of Hong-Kong is delightful and healthy, and compares favorably with any other in the world. But in summer comes the rainy season, with high temperature, thunder-storms, and typhoons; and these meteorological disturbances are accompanied and followed by a general derangement of the health of the community. Malarial fevers and bowel affections prevail.

The English troops stationed here have at this season suffered very severely on several occasions, and it was at one time found necessary to remove them from shore to shipboard, so great was the mortality.

During the eight years from 1858 to 1865, inclusive, the percentage of deaths to the number of residents was as follows: 1858, 7.51; 1859, 6.66; 1860, 3.20; 1861, 6.48; 1862, 2.24; 1863, 6.32; 1864, 5.55; 1865, 4.89. The average population for this period was 1,486.

The diseases most commonly met with here are dysentery, diarrhea, intermittent and remittent fevers, small-pox, sunstroke, syphilis, eczema, hepatitis, phthisis, and typhoid fever.

In 1865, Dr. Murray, colonial surgeon, reported that an epidemic of yellow fever prevailed here. He says: "It was first recognized in Victoria jail, upon the 3d of March, when a prisoner, who was said to have come directly from Macao, was seized with symptoms closely resembling those of yellow fever. No new cases occurred until the 15th of the same month, and during the whole of March there were five cases only, but of these three had terminated fatally. The disease increased rap-

idly until it attained its acme, on the 2d of May, on which day there were forty-six cases in hospital, inclusive of eighteen admissions on that day. From that period it commenced to decline, but did not entirely disappear until there had been 373 admissions and 40 deaths."

In the winter small-pox prevails always among the Chinese, who still adhere to their old custom of inoculating their children in the nostrils.

Syphilis is less prevalent here than in any other port on the Chinese coast visited by this ship, and we cannot but attribute this immunity to the strict regulations regarding prostitution that are enforced here. A lock-hospital, a weekly inspection of the brothels, and a weekly examination of the prostitutes have so far checked this disease that during our stay of two months here, when constant liberty was given to the men, not a single case of syphilis was contracted.

Here and in other ports on this coast a form of eczema prevails, known generally by the name of "washerwoman's itch." It first appears as a common ring-worm, the inside of the thighs, scrotum, and axillæ being its favorite seats. Soon other patches appear, and these coalescing may cover a large extent of surface. The pruritus attending this eruption is something unbearable, and the sufferer tears with his nails the part till the blood flows. Although eczema is not usually regarded as a contagious disease, still the opinion of the best physicians, who have seen this variety of it, concur with the popular opinion in that, that the washed clothes are commonly the carriers of the seeds of this affection. Whence come the seeds is not known. Perhaps from the bodies of natives similarly affected, but more probably, as Dr. Jamieson* suggests, from the foul and stagnant pools in which the clothes of foreigners are usually washed.

The disease is parasitic, and under the microscope a multi-

* Customs Medical Report, No. 6.

tude of cryptogamous growths may be seen. To all the ordinary treatments for eczema this disease is rebellious. Soaps always make it worse, and all stimulating ointments act in a similar manner. The destruction of the parasite by means of a solution of caustic soda or potassa, followed by an application of cold cream or simple cerate, will often produce a cure.

Instead of the caustic solution, a preparation, called "Goa powder," is extensively sold throughout the east as a parasiticide, and often acts with great promptness in this disease. This powder is a proprietary article, and I am not acquainted with its composition.

Meteorological table from record of the Government Civil Hospital, Hong-Kong.

Month.	Barometer.		Thermometer, Fah.		Rain.		Remarks.
	Max.	Min.	Max.	Min.	No. of days.	In.	
			°	°			
January	30.22	29.95	69.5	44	4	.86	Pleasant.
February	30.22	29.86	72.5	43	.....	.....	Fine, cool.
March	30.22	29.83	76	55.5	4	.41	Very fine.
April	30.06	29.68	85.5	61	5	.05	Do.
May	29.99	28.26	84.5	70	14	9.40	Pleasant showers.
June	29.96	29.70	86.5	72	19	21.39	Frequent showers.
July	29.97	29.70	87	81	20	29.25	Heavy showers.
August	29.97	29.62	91	73.5	17	28.10	Frequent thunder-storms.
September	30.06	29.73	91.5	78	13	9.97	Occasional thunder-showers.
October	30.28	29.90	85	66.5	6	2.90	Fine and dry.
November	30.24	29.95	78.5	62.5	1	.30	Do.
December	30.28	29.99	74	52	9	1.06	Foggy, cold, and rainy.
						103.69	

AMOY.

Amoy is situated in latitude 24° 10′ north, longitude 118° east. The foreign population lives upon the island of Koolansoo, and numbers about 120 souls. Being a port of considerable commercial importance, it has a floating population nearly equal in number to the permanent residents.

There are three hospitals here. Two are for the treatment of foreigners, sailors chiefly, and the third is a mission hospital for natives.

The diseases most prevalent among foreigners are miasmatic diseases, venereal diseases, and diseases of the digestive organs.

During the three months we were there in this ship there were treated on board for febris intermittens, 28; gonorrhea, 32; infecting chancre, 17; non-infecting chancre, 10; consecutive syphilis, 7; diarrhea, 38; dysentery, 18; total, 150.

Malaria, in its various forms, and with its varied sequelæ, is the curse of the whole region about Amoy. The natives in vast numbers suffer, and in them can be seen the effects of this poison when it is allowed to have its own way with the human system. I am indebted to Dr. David Manson, who is now in charge of the Chinese hospital, for many opportunities to see the numerous patients that come to this institution for advice and medicine. The greater number which I saw had some of the sequelæ of marsh-poisoning. Chronic rheumatism, anæmia, enlarged spleen, dropsy, neuralgia, paralysis, ulcers, dyspepsia, diarrhea, hemorrhoids, enlarged liver, albuminuria, impotency, checked development, menstrual affections, necrosis, and elephantiasis arabum are some of the diseases, but by no means all, that we see here which can be traced directly to previous paludal poisoning.

About the 10th of August, 1872, this place was visited for the first time by an epidemic of dengue, which lasted till the 1st of October following. It was estimated by Dr. Manson that 95 per cent. of the native population suffered, but there were no deaths to be attributed to this disease alone. Vessels from Singapore probably brought the disease here.

The most interesting diseases to be seen here are leprosy and elephantiasis arabum. Some of the milder cases of leprosy are undoubtedly benefited by a long-continued course of alteratives, such as Donovan's solution or the iodide of potassium, but in the more severe cases, where the disease has already manifested itself by the deepened color and swelling of the skin, little good can be expected from medication.

For many cases of elephantiasis, however, much has been done; and, when the disease has been confined to the scrotum, permanent cures have been effected by surgical interference. The Drs. Manson have successfully operated on more than thirty cases, always without the sacrifice of either the testicles or penis; and, so far as they know, the disease has returned in but a single instance.

Dr. Manson has described* a disease which he denominates "lymph scrotum," and which seems to be of the same nature as the true elephantiasis of this part, differing from it in that, that in the "lymph scrotum" the lymph remains in a fluid condition, while in the latter it is organized into a tissue of a gelatinous character. The following history of the disease, extracted from Dr. Manson's article before referred to, is of interest, and I therefore insert it.

"The patient, of any age from eighteen to seventy-two, has probably been subject to attacks of malarial fever; usually he has had many attacks, but sometimes only one. During a paroxysm of the fever the scrotum and inguinal glands, or perhaps the testicles, become inflamed. Such attacks of fever and inflammation may be repeated many times; and usually, during one of these, an abscess forms in the scrotum. After one of these attacks, the swelling of the parts having somewhat subsided, vesicles are discovered on the surface of the thick and roughened scrotum; after a time one of these vesicles bursts spontaneously or is opened, and a large quantity of straw-colored, serous-looking fluid escapes. The opening thus made is maintained for several days, and, when about eight or ten ounces or more of fluid have run away, heals. The bulk of the scrotum is much reduced by the discharge. After a very few days, however, the fluid reaccumulates, the vesicles refill, and the affected part becomes as big and cumbersome as before. In

* Customs Medical Report, No. 5.

every case the inguinal glands are enlarged. If the fluid is examined it is found to be loaded with albumen, and to have a specific gravity of about 1.010; it coagulates spontaneously, and contains corpuscles like those of blood, the spherical in a much larger proportion than in that fluid, and those resembling the red corpuscles destitute of color and cohesive properties. Should the fluid contain a very large quantity of corpuscles, it may be of a light salmon-color and milky consistence. The coagulum has the property of contracting, in some cases redissolving, and it invests itself with a net-work of delicate red lines resembling dilated capillaries or very small blood-vessels. * * * Why the lymph should not become organized into a tissue, as in ordinary elephantiasis, when in the body, is the mystery of the disease."

The same condition is probably referred to by Dr. Morehead.* He says: "Sometimes a milk-like fluid oozes in considerable quantity from the hypertrophied papillæ of the skin, and generally coagulates spontaneously into a gelatinous mass."

There is a malarial history in every case of elephantiasis arabum which appears here. The usual story is that five, ten, or fifteen years ago the patient had an attack of ague, which lasted him for a month or two; that during the attack his foot, we will say, became swollen and painful, but when the ague ceased the local trouble ceased, and no difficulty was experienced till the following year, when ague returned, with increased swelling and pain in the foot. The ague got well again after a few weeks, but the foot remained enlarged. Each year the ague returned and brought with it an increase of the local disease, till eventually the affected part assumed the huge, unsightly appearance so characteristic of this variety of elephantiasis.

Affections of the eye are very numerous in China, and num-

* Researches on Disease in India, p. 699.

bers so afflicted come to the hospital here for surgical relief. Dr. Jones, who has resided here for many years, and given very especial attention to the treatment of diseases of the eye, informed me that he had operated successfully on two hundred cases of cataract alone.

Cholera has made several visits to Amoy in past years. Its introduction has usually been attributed to vessels coming from Bangkok or the Straits Settlements, between which places and Amoy there is constant commercial intercourse.

*Table of temperatures, Fahrenheit,** 1872.

Month.	Max.	Min.	Mean.	No. rainy days.
	°	°	°	
April	79	62	69.8	2
May	82	65	74	13
June	89	72	78.9	17
July	89	80	84.7	3
August	92	73	82	9
September	90	73	79.4	5

Customs Medical Report, No. 4.

ISLAND OF FORMOSA.

This island lies between the twenty-second and twenty-sixth degrees of north latitude and beneath the one hundred and twentieth meridian east longitude. The western and northern portions of this island are thickly populated by Chinese; the eastern and southern parts are in possession of the savage aborigines. Upon the western coast are situated the cities of Takow and Taiwan-fu, regarding which I obtained a few items of interest.

*Table of temperature for the year ending March 31, 1873.**

Month.	Highest.	Mean highest.	Lowest.	Mean lowest.
	°	°	°	°
April	84	80	72	76
May	85	83	76	79
June	89	86	80	82
July	90	86	80	82
August	89	85	79	82
September	89	85	78	80
October	87	83	74	76
November	85	81	66	69
December	83	76	60	66
January	77	74	55	57
February	80	78	52	58
March	83	79	61	63

Customs Medical Report, No. 5.

The diseases that prevail here are almost precisely the same as those we see at Amoy, on the mainland opposite. The prevalence of malarial disease among the Chinese is exposed by the following table, taken from Dr. Manson's report:*

Fevers.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Total.
Intermittent:													
Quotidian	6	28	49	49	30	35	48	22	20	7	7	2	309
Tertian	1	8	24	33	11	17	20	14	7	2	1	8	146
Quartan	4	3	8	8	12	14	10	8	15	4	10	12	108
Remittent	2	10	35	38	14	19	18	11	5	1	....	2	155
Total	13	49	116	128	67	85	96	61	47	14	18	24	718

We see by this table that the greatest sickness prevails from June to October, inclusive. These months constitute the rainy season and the season of typhoons on this coast. The table also is interesting as showing the relative frequency of the different types of intermittent fever when this disease is left to nature, as it had been in nearly all the cases here presented.

The prevalence and malignancy of malarial fever in the island were made apparent during the past summer by its havoc in the Japanese expeditionary force then in possession of the southern end of the island. Eight or ten deaths occurred daily in a

* Customs Medical Report, No. 5.

[illegible] and so many more were prostrated by the disease and went back to Japan, their places being filled by recruits, that by September no man, it was said, belonging to the original force that landed in May remained.

The dengue which prevailed in Amoy during the summer of 1873, appeared at Tai-wan-fu early in October of that year. Intercourse between the two places was direct and constant, and passengers sick with this fever were landed here. Nearly the whole population of Taiwan-fu suffered from it.

Phthisis is not an infrequent disease in Formosa, forty-seven cases having been treated at the hospital in 1872. Bronchocele is occasionally met with. Lumbrici are troublesome here as in all Chinese ports. Smallpox prevails frequently among both Chinese and savages.

There is found in Formosa a brown-spotted leech, which has strong parasitic propensities. It takes up its abode in the nasal fossæ, and remains as a permanent resident. Its presence gives rise to frontal headache, discharge of mucous from the nostrils, feeling of congestion about the nasal passages; in fact, the common symptoms of a severe coryza, for which it is often mistaken. Dr. Manson, of Amoy, showed me a leech, preserved in alcohol, which had been removed from the nostrils of a gentleman who had been traveling in Formosa. This gentleman had been treating himself for a "cold in the head" for some weeks before he was fortunate enough to fall into the hands of one who could relieve him of his distress.

SHANGHAI, CHINA.

The city of Shanghai is situated in latitude 31° 14′ north, longitude 121° 28′ east, on the eastern border of the province of Kiang-su, a vast plain, estimated to contain forty-five thousand square miles.

*Meteorological table for the year ending September 30, 1873.**

Month.	Highest barometer.		Lowest barometer.		Thermometer.		Number of gales.	Prevailing winds.
	Barometer.	Thermometer attached.	Barometer.	Thermometer attached.	Maximum.	Minimum.		
		°		°	°	°		
October, 1872	30.43	62	30.10	76	85	51	.....	N. N. E.
November, 1872	30.64	58	30.16	65	76	30	2	N. W., N. N. W.
December, 1872	30.64	48	30.05	56	67	28	1	W. N. W.
January, 1873	30.55	38	29.70	39	57	25	4	N. W., N. E.
February, 1873	30.65	35	29.05	52	65	23	2	N. W.
March, 1873	30.45	53	30.00	58	64	33	.....	N. E., S. E.
April, 1873	30.35	55	29.84	68	80	41	3	Variable.
May, 1873	30.25	59	29.80	71	84	45	2	S. E.
June, 1873	30.15	70	29.73	75	82	61	1	E. S. E.
July, 1873	30.01	81	29.74	82	96	73	1	S. S. E.
August, 1873	30.05	74	29.73	76	94	70	.....	S. E., N. E.
September, 1873	30.16	70	29.74	77	85	65	3	N. E., N. W.

* Customs Medical Reports, Nos. 5 and 6.

These observations were taken at Woosung, twelve miles from Shanghai, and do not fairly represent the temperature of the hot season in the latter place.

There are four hospitals here; three for the treatment of natives, and one for foreigners. The latter is under the superintendence of the Sisters of Charity, who give to the sick every care and attention possible. These four hospitals are designated as follows: The Shanghai General Hospital, the Gutzlaff Hospital, the Chinese Hospital, the Episcopal Mission Hospital.

There are nine physicians practicing medicine here at the present time.

The foreign population of Shanghai amounts to about 2,000, and during the year ending September 30, 1873, there were ninety-eight deaths, which give a yearly rate of forty-nine to the thousand. This is an under, rather than an over, statement of the death-rate for the year, as there were some burials in the Catholic cemetery of which no record was obtained.

The burial-returns* show the cause of death to be as follows: Variola, 3; pneumonia, 2; phthisis, 4; aneurism, 9; atrophy of liver, 1; convulsions, 1; hepatic abscess, 4; enteritis, 1; meningitis, 1; acute mania, 1; alcoholism, 1; typhoid fever, 5; cancer, 2; albuminuria, 1; dysentery, 4; parturition, 2; tetanus, 2; syncope, 1; accident, 18; murder, 1; suicide, 1; brain-disease, 4; epilepsy, 1; cholera infantum, 2; heart-disease, 4; bronchitis, 2; tuberculosis, 2; exhaustion, 1; uræmia, 1; asthma, 1; syphilis, 1; uncertified, 14; total, 98.

The monthly death-record was as follows: October, 9; November, 7; December, 7; January, 8; February, 10; March, 9; April, 4; May, 9; June, 7; July, 8; August, 4; September, 16.

Water.—The shipping at this port is furnished with water by two different companies, viz, the Pootung Company and the Astor House Company.

I have examined water from both sources, and the methods of purification adopted.

The Pootung water is taken directly from the river here, opposite the foreign settlement and below the native city, and is pumped into a reservoir, where it settles. It is then drawn off into a second reservoir, from which it filters downward through sand, pebbles, shells, and wood-charcoal into the bottom of a third, which is partly filled with sand and shells, and, filtering upward through these, is drawn off for use. In other words, the water is simply allowed to settle, and is then strained. The small quantity of charcoal used, in comparison with the large amount of water filtered, can exert no appreciable effect on its character. The water, however, is clear, and, when first filtered, is not unpleasant to taste or smell, but on standing in warm place for a few days it emits an offensive fishy odo

* Customs Medical Reports, Nos. 5 and 6.

Chlorides in considerable quantity, and lime, are the only impurities discovered, except organic matter.

The other specimen, that furnished by the Astor House Company, did not differ materially from the former, except in the presence of sulphates, which have been added in the form of alum to precipitate the coarser impurities of the river-water.

Both these specimens of water react with the permanganate of potassa test for organic matter, and, as before mentioned, become offensive from decomposition of this matter when exposed for a length of time to a summer-temperature.

Shanghai, from its location, must always suffer from the want of potable water in sufficient quantity to supply the demand. The Woosung River, the Soochow and Yang-king-pang Creeks, furnish all water used; and being the drains not only of the foreign and native cities of Shanghai, but of numerous towns and hamlets scattered along their banks, their waters become laden with filth and germs of disease, and no process of purification, except distillation, can render them positively innocuous. It is impossible to strain out through charcoal and sand organisms of the atomic length of the one thousandth of a millimeter, and boiling will not destroy life that bears with impunity any temperature below 257° C.

But bad as this water is, for want of other, they must use it on shore, and from this use spring not a few of the diarrheas and dysenteries and fevers that combine to give Shanghai its bad name as a summer-residence. For economy's sake, and in order to keep a clean ship, it is desirable to obtain water from the shore when this can safely be done, but at this port it is strongly recommended that no consideration be allowed to interfere with the distillation of all the water used for cooking and drinking purposes on board vessels of the Navy.

Only an order from the proper authority will accomplish without fail what is here recommended.

In making up the foregoing statistics I have been under the constant necessity of referring to the "Chinese Customs Medical Reports." By order of the inspector-general of customs, these reports are made every six months, from all the treaty-ports of China, by the medical officers connected with the Chinese customs. Dr. Alexander Jamieson, of Shanghai, superintends their publication, and to him I am indebted for copies of the same.

This is the first attempt in China to establish a publication in the interests of medical science. It has been in existence but three years, yet it has already been the medium for the publication of not only numerous statistics of meteorology and disease, but of several valuable monographs on diseases prevalent in the far east.

Report of Samuel F. Shaw, M. D.,
Surgeon U. S. Navy.

U. S. S. Kearsarge.

HYGIENE.

Complement of officers and men.—This ship was put in commission at the Mare Island navy-yard on December 8, 1873, and received on board, on that day, her crew of officers and men, numbering 205 persons. During the first quarter of the current year the average number of persons on board was 200; second quarter, 195; third quarter, 194; fourth quarter, 197. The average for the year has been 196½.

Air-space allowed.—The men are berthed as follows: One hundred and thirty-two on the berth-deck, and 47 underneath the forecastle. The berth-deck, when clear, contains 12,480 cubic feet of air. The space occupied by mess-chests, bags,

bakery, hawser-coils, &c., is estimated at 400 cubic feet, and the space occupied by 132 men and their bedding is estimated at 1,320 cubic feet. The quantity of air, therefore, for each man at night, both watches being below, as in port, is 81 cubic feet. At the time of going into commission the amount of air on the berth-deck was even much less than at present. In the forward part, a bulk-head shut off a considerable space for a sick-bay, and in the after part were four large state-rooms, mess-room, and pantry for the warrant-officers. All these have been since removed, thereby adding about one fourth to the air-space of the berth-deck.

There are two cells for the confinement of prisoners on the after part of the berth-deck. One contains $193\frac{6}{10}$ cubic feet of air, and the other $193\frac{1}{10}$. This amount is, of course, to be divided among the number confined in each.

The forecastle berths 47 men; but as it is freely open aft, and has two gun-ports on each side and two hatches overhead, the supply of fresh air is abundant.

The steerages each contain about 600 cubic feet of air, and the steerage-country about 1,348 cubic feet; in all, some 2,544, which, divided among seven officers, the number at present occupying the steerages, gives each one 363 cubic feet.

The air-space of the wardroom state-rooms averages about 144 cubic feet, and of the wardroom-country about 2,400 cubic feet. The aggregate air-space of the twelve state-rooms and of the wardroom-country amounts to 4,128 cubic feet, which gives each wardroom-officer 344 cubic feet of air.

Ventilation.—The berth-deck is ventilated as follows: First, by three hatches in the spar-deck, two, however, being under the forecastle. The forward one is 4 feet in length by 2 feet in width; the next one is 5 feet by 4 feet 9 inches; the main hatch is 5 feet by $5\frac{1}{2}$. Second, by four man-holes in the deck above the after part of the berth-deck; third, by thirty-three air-ports, $7\frac{3}{4}$

inches in diameter; fourth, by two doors opening into the engineers' part of the ship, close by which is the fire-room hatch. The starboard door is 6½ by 2 feet, and the port one 6½ feet by 21 inches. The aggregate area of all these avenues for the access or removal of air is 97 square feet. If we suppose one-half of this area to be exposed to the ingress of air, and the other half to serve for its egress, and the incoming air to be passing in, with a velocity of 10 feet per minute, all the air on the berth-deck, or an equal quantity, ought to be changed in about twenty-four minutes. The air-ports are closed when at sea; but there is some compensation for that, in the fact that only one watch is then below at a time. Wind-sails are carried down the main hatch, and the one next forward of it, whenever required. Generally the berth-deck of this ship seems to be fairly ventilated, and there are no *culs-de-sacs* in any part of it where the air can become stagnant or remain long unchanged.

The cells for prisoners are only ventilated by one air-port in each, which is, of course, closed when at sea.

The forecastle is ventilated by two hatches overhead, two gun-ports on each side, and by being freely open aft.

The fire-room has two ventilators and a wind-sail. The engine-room is well ventilated, being directly underneath a large hatch. It has also a wind-sail.

The steerage-country is ventilated by a hatch, 5½ feet in length by 2¾ feet in width, by a door opening into the engine-room, and by two doors opening into the wardroom-country. Each steerage is ventilated by two doors opening into the steerage-country, and by two air-ports. A wind-sail is let down the steerage-hatch as occasion requires.

The wardroom is ventilated through a hatch, 10 feet in length by 6 in width, through the doors opening into the steerage-country, and through fourteen air-ports in the state-rooms and pantry. There is a wind-sail for the wardroom-hatch, when required.

Water.—The water used on board during the past year has generally been obtained from shore, except when making passages at sea. It is received into iron tanks, which contain, altogether, 2,700 gallons. The usual daily issue has been 350 gallons. The ship carries, therefore, at that rate of issue, about eight days' water for her complement of officers and men.

For the testing of water, as to its potability, I would recommend that oxalate of ammonia and chloride of barium be added to the allowance table as an addition to the reagents we already have.

Warming.—The berth-deck is warmed in cold weather by means of a sheet-iron oven provided for baking bread.

In the forecastle is the ship's galley, which, with a curtain at the break of the forecastle, warms it sufficiently, even in very cold weather.

The steerage-country, wardroom, and cabin are provided with steam-heaters.

Percentage of sickness and mortality.—The average number of days each man has been on the sick-list is as follows: During the first quarter of the year, $2\frac{4}{5}$ days; second quarter, $3\frac{1}{2}$ days; third quarter, $2\frac{1}{5}$ days; fourth quarter, $3\frac{1}{2}$ days. The average for the year has been 12 days.

The transfers to hospitals have been as follows: During the first quarter, 10; second quarter, 4; third quarter, 3; fourth quarter, 0. Total, during the year, 17.

The deaths, during the year, 1.

The number of admissions to the sick-list has been as follows: During the first quarter, 77; second quarter, 121; third quarter, 123; fourth quarter, 98. Total admissions, 415.

The diseases, numbering six or more cases admitted, have been as follows: During the first quarter, bronchitis acuta, 13; febris intermittens, 12; rheumatismus chronicus, 8. Second quarter, diarrhœa acuta, 18; rheumatismus chronicus, 12; fe

bris intermittens, 9; syphilis primitiva, 9; cholera morbus, 6. Third quarter, diarrhœa acuta, 17; cholera morbus, 12; rheumatismus chronicus, 8; febris intermittens, 6. Fourth quarter, febris intermittens, 8; rheumatismus chronicus, 11; cephalalgia, 14; diarrhœa acuta, 6.

Aggregate report of sick for the year ending December 31, 1874, for the United States steamer Kearsarge, Asiatic squadron.

Diseases.	Remaining from 1873.	Admitted in 1874.	Discharged to duty in 1874.	Discharged from service and deserted in 1874.	Transferred in 1874.	Died in 1874.	Continued to 1875.
Class I. Zymotic diseases:							
Order I. Miasmatic diseases:							
Erysipelas		1	1				
Febris intermittens	1	34	27		7		1
Order II. Enthetic diseases:							
Syphilis primitiva	1	17	18				
Syphilis consecutiva		6	5		1		
Gonorrhœa		6	6				
Order III. Dietic diseases:							
Delirium tremens		1	1				
Class II. Constitutional diseases:							
Order I. Diathetic diseases:							
Adynamia		2	1		1		
Rheumatismus acutus		4	4				
Rheumatismus chronicus	2	39	39		1		1
Class III. Parasitic diseases:							
Vermes		1	1				
Class IV. Local diseases:							
Order I. Diseases of the nervous system:							
Cephalalgia		42	41				1
Epilepsia		2	1		1		
Insolatio		2	2				
Neuralgia		10	10				
Paralysis		1	1				
Order II. Diseases of the eye:							
Conjunctivitis		4	4				
Iritis		1	1				
Ophthalmia		1			1		
Order III. Diseases of the ear:							
Otitis		2	2				
Otorrhœa		1	1				
Order V. Diseases of the circulatory system:							
Palpitatio		1	1				
Order VI. Diseases of the respiratory system:							
Bronchitis acuta	3	20	23				
Catarrhus		7	7				
Laryngitis		1	1				
Phthisis pneumonica acuta		1				1	
Phthisis pneumonica chronica		1			1		
Pleuritis		3	3				
Pneumonia		1					1

Aggregate report of sick for the year ending December 31, 1874, *&c.*—Continued.

Diseases.	Remaining from 1873.	Admitted in 1874.	Discharged to duty in 1874.	Discharged from service and deserted in 1874.	Transferred in 1874.	Died in 1874.	Continued to 1875.
Order VII. Diseases of the digestive system:							
Cholera morbus	.....	21	21	.....	.....	.....	.....
Colica	.....	6	6	.....	.....	.....	.....
Constipatio	.....	5	5	.....	.....	.....	.....
Diarrhœa acuta	.....	46	46	.....	.....	.....	.....
Dysenteria acuta	.....	9	9	.....	.....	.....	.....
Dysenteria chronica	.....	1	.....	.....	1	.....	.....
Dyspepsia	.....	1	1	.....	.....	.....	.....
Hæmorrhois	.....	1	1	.....	.....	.....	.....
Icterus	.....	1	.....	.....	1	.....	.....
Tonsillitis	.....	4	4	.....	.....	.....	.....
Order VIII. Diseases of the urinary and genital system:							
Nephritis	.....	1	.....	.....	1	.....	.....
Orchitis	.....	3	3	.....	.....	.....	.....
Enuresis	.....	1	1	.....	.....	.....	.....
Hydrocele	.....	1	.....	.....	.....	.....	1
Order IX. Diseases of the locomotive system:							
Synovitis	.....	1	1	.....	.....	.....	.....
Order X. Diseases of the integumentary system:							
Abcessus	.....	3	2	.....	1	.....	.....
Adenitis	.....	6	5	.....	.....	.....	1
Erythema	.....	1	1	.....	.....	.....	.....
Furunculus	.....	18	17	.....	.....	.....	1
Herpes	.....	1	1	.....	.....	.....	.....
Paronychia	.....	3	3	.....	.....	.....	.....
Perulo	1	3	4	.....	.....	.....	.....
Ulcers	.....	3	3	.....	.....	.....	.....
Class VI. Violent diseases and deaths:							
Order I. Wounds, injuries, and accidents:							
Abrasio	.....	1	1	.....	.....	.....	.....
Contusio	.....	20	19	.....	.....	.....	1
Luxatio	.....	6	6	.....	.....	.....	.....
Stremma	.....	8	8	.....	.....	.....	.....
Vulnus contusum	.....	14	14	.....	.....	.....	.....
Vulnus incisum	.....	9	9	.....	.....	.....	.....
Vulnus lacerat um	.....	1	1	.....	.....	.....	.....
Vulnus punctum	.....	4	4	.....	.....	.....	.....
Total	8	415	397	.....	17	1	8

Average number of persons on board, 196; number of sick-days, 2,348; daily average of patients, 6 158-365.

[illegible]

Maximum, minimum, and average monthly temperature.

Month.	Maximum.	Minimum.	Average.
	° F.	° F.	° F.
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Maximum, minimum, and average monthly pressure.

Month.	Maximum.	Minimum.	Average.
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible] thermometer.

Month.	Maximum.	Minimum.	Average.
	°	°	°
[illegible]	59	40	48
[illegible]	65	41	51
[illegible]	81	47	64
[illegible]	89	70	75
[illegible]	84	56	69
[illegible]	85	63	76
[illegible]	85	69	77
[illegible]	88	73	80
[illegible]	85	49	65½
[illegible]	66	29	50
November	55	8	32
December	62	16	39

Meteorological phenomena generally.—The first two months of the year were passed off the navy-yard, Mare Island, California. The weather was generally rainy and cold, the average tem-

perature for the first month being 48° Fahrenheit, and for the second, 54°.

March, April, and nearly one-half of May, were mostly passed at sea, saving ten days at Honolulu, Hawaiian Islands. The first week or two of the voyage across the Pacific was cold and wet. The remainder of the passage was made mostly in clear and pleasant weather.

At Yokohama, from May 12 to August 13, the weather was generally pleasant, with occasional rains, the temperature for that time averaging 76°.

At Nagasaki, on August 21, we encountered a typhoon. The barometer fell to 28.21. The Japanese man-of-war Stonewall and transport Madras were driven on shore; also, several private steamers and sailing-vessels. Many sampans and junks were wrecked, and several hundred persons drowned from them. Several houses in the town were utterly demolished, and hundreds more or less damaged.

At Vladivostok the days were, almost without exception, clear and cool.

MEDICAL TOPOGRAPHY.

At the Hawaiian Islands, a few years ago, leprosy assumed such proportions as to excite the gravest apprehensions, but since the very general isolation of those afflicted with the disease by removal to the island of Molokai, a check to its spread seems to have been made. In addition to the establishment for lepers on Molokai, there is a hospital for them near Honolulu. Also, at the latter place, there is the marine hospital of Dr. McGrew, formerly a surgeon in the United States Army. The rapid decimation of the Hawaiian Islands is attributed to a variety of causes, but principally to syphilis, from some form of which it is said that few of the natives are entirely free. Our men had two days' liberty there, with the result that six contracted syphilis of sufficient severity to unfit them for duty.

No case of the secondary disease has appeared on board in consequence of exposure at the port of Honolulu.

At Nagasaki, Japan, the only hospital is a native one, at present in charge of a Dutch surgeon, stationed at the factory on the Island of Desima. He states that some twenty to twenty-five cases of the disease called beriberi come under his observation at the hospital in the course of a year. Most of the cases recover. The law of Japan not permitting *post-mortem* examinations, he has not been able to learn from his own dissections anything as to the morbid anatomy of the disease.

The harbor of Vladivostok, Siberia, where the Kearsarge lay from early in September to about the middle of December, is some two and a half miles in length from east to west by half a mile in width. The entrance is on the southwest, and is narrow. The harbor, save upon the northwest, is well sheltered by surrounding hills, and the adjacent country is generally wooded. The public buildings and settlement are scattered along the entire northern shore and western end of the harbor. The machine-shops are situated on the western shore, but are to be removed farther up the bay. The settlement, foreign and native, comes next, and east of this, along most of the northern shore, are scattered the public offices, store-houses, barracks, and hospitals. Most of the buildings, public and private, are simply log-houses, and are heated in cold weather by means of brick furnaces. The population consists at present of about 500 civilians, (many of whom are Coreans and Chinamen,) 200 soldiers, 2,000 sailors, and 250 officers and officials.

The hospital is situated at the eastern end of the town, and consists of three buildings, made of cedar-logs. In each are two wards, 35 feet in length by 27 in width, and 14 in height. One only of the wards is plastered. All have double windows, are heated by brick furnaces, and are ventilated mostly through the doors and windows. Each ward contains twelve beds with

straw mattresses, and is provided with a bath-tub mounted on wheels. The kitchen is in a separate building. The number of patients averages about seventy, of whom nearly one-half are females. The annual appropriation for the hospital amounts to 75,000 rubles. Medical Director Pheiffer, of the Russian navy, is in charge, and has two assistants. The prevailing diseases during the hot months are diarrheas and other abdominal disorders; in the fall, a mild form of malarial fever; and during the cold months, intra-thoracic inflammations, rheumatism, measles, and typhoid fever. Venereal diseases, especially among the convicts, male and female, prevail at all seasons of the year.

The maximum, minimum, and average monthly temperature during the last two years, as obtained by Assistant Surgeon W. J. Riggs, U. S. N., from the observations made at the submarine telegraph-station, are given in the subjoined table.

Month.	1872.			1873.		
	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
	°	°	°	°	°	°
January	20 F.	−22 F.	¼ F.	33 F.	−18 F.	1½ F.
February	40	− 4	12¾	39	−20	10½
March	45	0	29	44	− 3	24
April	57	25	40½	57	20	38
May	68	39	50	73	29½	48½
June	80	45	59	80	44	57
July	91	55	62½	92	51½	66
August	85	55	67	84	50	70
September	75	45	62	77	39	59
October	68	25	51	66	29	47
November	56	4	33	49	5	29
December	43	−10	14	39	−25	12

Report of Daniel McMurtrie, M. D., *Surgeon U. S. Navy.*

U. S. S. Ashuelot.

HYGIENE.

Complement of officers and men, 166; cubic air space allowed each individual on shipboard, 150 feet; percentage of sickness, 2.5 per cent.; mortality, 0.

Ventilation.—The berth-deck, immediately below the spar-deck, is ventilated by three large hatches, and by six air-ports on either side. During the warm season these hatches are supplied with wind-sails. The cabin is provided with a hatch and sky-light, and three air-ports on either side; wardroom has a sky-light at either end, and an air-port to each state-room. A large hatch and two air-ports on a side supply the steerage. By means of the sky-lights, cabin and wardroom are each supplied with a wind-sail in warm weather. Notwithstanding these seemingly abundant means for ingress and outlet of the atmosphere, considerable suffering and illness are occasioned during the hot summer-months by reason of the high temperature that obtains on shipboard, in consequence of the vessel's hull being constructed entirely of iron—a substance possessing in such an eminent degree powers of absorbing, conducting, and radiating heat. In a sanitary point of view this seems to me a serious defect in iron vessels. In summer their interior is inordinately hot and enervating, while in winter the metallic influence is perhaps equally unhealthful, through the obvious tendency to dampness. It is suggested that the first evil might be greatly alleviated by giving the air-ports a larger diameter—say ten or twelve inches, instead of seven, as at present—and by the construction of a vertical awning, rigged out at a sufficient distance from the side to admit light and air, and at the

same time protect the iron hull from the burning rays of the sun. The engine-room derives its supply of air from the large, open crank-room above, and from a hatch in the after part; the fire-room is supplied by a large, open hatch on the spar-deck, by its communication with the engine-room, and by four cylindrical ventilators, with revolving hoods, from the hurricane-deck.

The hatches and air-ports that supply ventilation also afford an abundance of light to all parts of the vessel, except the state-rooms, dispensary, and issuing-room. Larger air-ports would remedy this defect.

In cold weather the berth-deck, cabin, and wardroom are warmed and rendered comfortable by means of stoves proportioned to their several dimensions.

Water.—Chief source from distillation, though at Shanghai and at Nagasaki the tanks have occasionally been filled from the shore. The specimens were transparent and crystalline in appearance to the naked eye, and all contained lime-salts in variable quantities. The changes from the use of pure distilled water to hard water, and *vice versa*, invariably occasion disorder of the bowels and digestive functions, and more or less diarrhea. In my opinion they should be carefully avoided when practicable.

The supply of fresh water issued on board has been uniformly sufficient for the health and cleanliness of the ship's company. It is preserved in two iron tanks in the hold. They contain about thirteen hundred gallons each.

Food.—This has consisted of the usual salt ration, alternated with fresh beef and vegetables twice or thrice a week. It was ordinarily well prepared by experienced cooks. The salt beef, bread, flour, and butter issued during the year have generally been of inferior quality.

Clothing has not been supplied to the crew from public stores.

Suitable and substantial garments, adapted to all seasons, may be obtained on shore at any port on the station at a lower cost than those supplied by Government. It is suggested that a suitable sun hat or cap be devised for sailors and marines, and authorized by the Department; also that a linen mustering-suit be prescribed for marines to be worn in hot climates.

CLIMATOLOGY.

The vessel has been very constantly cruising during the past year, and as the time spent in any one port has usually been limited to two or three weeks at most, I am unable, from actual observation, to give any data in respect to any particular locality that could serve a practical purpose.

MEDICAL TOPOGRAPHY.

The beginning of the past year found us at Yokohama, where the Ashuelot was undergoing extensive repairs. Early in April we proceeded to Kobé and Nagasaki, and thence to the coast of China. The situation of those ports of Japan and the diseases peculiar to them, establishments for the care of the sick, &c., were set forth in my last report.

Late in April we arrived at Shanghai, situated on the Woosung, an affluent of the Yangtse-Kiang, and forty-five miles from the sea. The approaches to this great commercial emporium are low, flat, and marshy on either hand, and the physical characteristics of the country, for many miles around, are tame and uninteresting. Both the Yangtse and Woosung have silty waters, and are brown, dirty, and unattractive in consequence. The latter, at low tide, is quite fresh at Shanghai, and, filtered, is used for domestic purposes.

As might be inferred from its latitude (31° 12′ north, longitude 121° 28′ east) and low surroundings, the atmosphere of Shanghai is always more or less malarious, and paludal fevers

and affections of the bowels are quite common. Frequently diarrhea and dysentery are epidemic in the hot summer-months, though there can be no doubt that the health of the port has greatly improved in the last ten years, owing to wise sanitary regulations. But the long continuance of the warm season, its impure water, its malarious location, and the frequent and sudden occurrence of cool winds from the sea during the hottest weather, must continue to render Shanghai more or less unhealthy in the latter part of summer, and one to be avoided at that season when practicable by our vessels of war.

Early in May we left Shanghai to make the ascent and visit the several ports of the great river, the Yangtse. For several hundred miles after the low banks became visible the view of the country was not beautiful. Indeed the effect produced by the poverty of the scenery was simply and unmistakably depressing. On either side was presented an immense plain, covered with tall grass, without a tree or shrub to relieve the monotonous uniformity. But on the second day the outlines of hills were seen above the horizon, and gradually developed into mountain-ranges on either hand, running parallel to the great water-course; groves of trees and cultivated fields diversified the great plain, and presented to the eye what it always seeks, and without which it is never satisfied—contrast. Stopping for a day or more at every city of consequence, particularly at the three treaty-ports of Chin-kiang, Kiu-kiang, and Hankow, we proceeded by easy stages until we had reached the limit of the navigable river, the Ichang gorge, one thousand miles from the sea.

Hankow, the most remote of the treaty-ports, has the largest foreign settlement—about sixty well-built houses. It is situated at the mouth of the river Han, a turbulent tributary of the Yangtze. It frequently overflows its banks in summer, and inundates the settlement and adjacent country. But for this

event there is no reason why the locality should not be healthful. We found malarious diseases very prevalent, and rheumatism of the white fibrous tissues not uncommon.

I will here make a few observations concerning the native cities. In their main features they are all very much alike, particularly to the eye of a foreigner. The Chinese are nowhere distinguished for cleanliness, and they have to pay the penalty hereas elsewhere. Filthy persons are easily satisfied with filthy homes, and, as a consequence of these two, filthy habits are common to the people. The only scavengers are the lazy swine and the hungry dog, domestic animals which rather tend to increase than diminish the gross filth which is almost universal in China. The result is that epidemics occasionally occur, and the deaths are very numerous. Eye-diseases are very common. Small-pox is never absent, and sometimes assumes the epidemic form. This loathsome disease is also perpetuated from year to year by the practice of inoculation, which pernicious system is tenaciously adhered to throughout this part of China. Every fourth or fifth person one meets is more or less small-pox marked, and many of these are blind or deaf. In the spring of the year it is common to see persons in the crowded streets with the pustules actually upon their faces. This fact should cause commanding officers to be very guarded in "granting liberty" in Chinese ports.

In September we again visited Tieu-tsin, the surroundings of which port I attempted to describe in my report last year. The malarious influences referred to we found to be quite active this year. The causes, as before, were the excessive heat of the summer and the proximity of a large tract of inundated country.

A month later we proceeded to the port of Newchwang, the most northerly of those open to foreign trade in the empire of China. It is situated in latitude 41° north, longitude 122° east,

on the last complete bend from east to west of the river Leaon, before it empties itself into the gulf of the same name. It is the principal port-town of Fungsang, the southern province of Manchuria. The physical characteristics of the country, for many miles in every direction, are most unattractive. The only elevations that arrest the eye are the mounds piled up over the graves of the departed; otherwise the country is a dead, dull, and dreary flat. What makes this immense plain, the basin of the Leaon, the more monotonous and unbearable, is the great scarcity of trees and shrubs, and the almost entire absence of grass. A few wild-flowers are to be seen here and there; but, in general, these, with the other beauties of nature, are most conspicuous by their absence. Add to this the brown, turbid waters of the Leaon, and the picture is anything but pleasing. "What," I asked, "can such a place have to recommend it?" The answer was, it could boast at least of a good climate.

In summer of every year the thermometer (Fahrenheit) indicates in the shade for several days heat as high as 84°, and, in winter, it occasionally falls to from four to ten degrees below zero—in fact, an excessive climate—but the discomfort of these extremes of temperature is greatly relieved by the dryness of the atmosphere. It has no rainy season. There are falls of rain occasionally of considerable quantity and violence; but they rarely continue more than twenty-four hours at a time, and are no sooner over than the air becomes dry and bracing. Heat, which would be intolerable, or nearly so, with the moist, drenching atmosphere of Southern China or of Japan, is here borne with little discomfort. In winter, on the other hand, no one complains of cold. The system is so stimulated by the dry, bracing atmosphere that gentle exercise is sufficient to excite and maintain a grateful and pleasant warmth. With such a climate, it may naturally be concluded that the people are healthy; and such is indeed true of the few foreigners who

reside there. Ague is almost unknown, and rheumatism and pulmonary diseases are rare. But among the natives there is the ever-present small-pox and other disorders, the offspring of their uncleanly habits.

The one other port visited during the year is Chefoo, situated on the north side of Shantung Promontory. The foreign settlement is small, but the native city is large and populous. By reason of its exposed situation, it is visited throughout the summer by grateful sea-breezes; the heat never becomes intense, and it is, therefore, a favorite resort during the hot months for invalid foreigners living in the southern and interior portions of China.

Report of J. B. Parker, M. D.,

Passed Assistant Surgeon U. S. Navy.

U. S. S. Yantic.

NATIVE HOSPITAL, AMOY, CHINA.

During the occupation of Formosa by the Japanese the United States steamer Yantic was stationed, in August, September, October, and November, 1874, at Amoy, China. This city, in latitude 24° 27′ north, longitude 118° 4′ east, has a population estimated at two to three hundred thousand; is situated on the southwest part of an island about twenty-two miles in circumference, ten miles from sea. Opposite the Chinese city, and separated from it by a stream three-fourths of a mile wide, is the island of Koolangsoo, about three miles in circumference, which affords protection to the inner harbor, and a residence for the small European community. The surrounding country is mountainous, with massive granite bowlders

everywhere protruding from the barren soil. Many of the bowlders lie upon the surface, and appear lightly perched upon each other, threatening destruction to life and property below. In the valleys, and perchance on some fertile hill-side, by constant irrigation, the soil produces rice, sweet-potatoes, and other food for the natives. Very little rain falls at Amoy, and then generally in the spring, which is often the cause of great suffering among the poorer classes on account of reduced harvests. Water is procured from wells sunk in all parts of the city and surrounding country, but it is only in the more elevated situations that it can be obtained free from salt. As in other Chinese cities, the houses are small, closely built, and separated from the opposite buildings by narrow alleys or lanes, which contain the accumulated filth of the city wherever sufficient space permits. The sewage of the city is carefully preserved for agricultural purposes. Great poverty prevails, and it is with difficulty that the inhabitants can procure the rice and fish which nourish them, or indeed the scant and cheap cotton-goods which clothe them. As elsewhere in China, a portion live on the water and gain a livelihood by transporting passengers to and from the shipping in the harbor or the opposite shore. A large trade is carried on at this port with the United States and along the coast. Agricultural, maritime, and mechanical pursuits are the chief occupations of the people. Their industrious habits, from necessity, exposure and labor incident thereto, meager diet, insufficient clothing, cause many of the diseases from which they suffer.

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Record of temperature for six months in 1872 *and* 1873.

[Instrument on wall facing northeast.]

Month.	1872.				1873.					
	Maximum.	Minimum.	Average.	Days of rain.	Maximum.	Average maximum.	Minimum.	Average minimum.	Mean.	Days of rain.
	°	°	°		°	°	°	°	°	
April	82	60	69.7	3	79	72.5	62	67.0	69.8	2
May	89	67	77.5	13	82	76.3	65	74.1	74.0	13
June	88	75	79.3	14	89	82.3	72	77.5	78.9	17
July	91	76	83.0	3	89	87.2	80	82.3	84.7	3
August	88	78	82.7	11	92	87.5	73	86.5	82.0	9
September	89	72	81.3	7	90	82.5	73	76.4	79.4	5

The port was opened to general foreign intercourse in 1843, and in the preceding year foreign medical treatment was first commenced among the people through the labors of missionaries, which, at a later period, resulted in the establishment of a hospital under their superintendence. This hospital, formerly the residence of a missionary, has an elevated situation of 100 feet above the sea in the suburbs and southern section of the city on the river-front. It consists of three stories, the two upper containing a large central hall and two large rooms on either side, the higher of the two opening on the south and west into a large veranda, which is well protected, and at certain seasons of the year can be used as a ward. The basement is divided into four smaller compartments, three of which are used for the reception and treatment of out-patients, and the fourth as a chapel. It accommodates comfortably one hundred patients, but frequently it contains more. Owing to the poverty of the institution and character of the patients, all of whom are extremely poor and primitive in their mode of life, only partial success attends the efforts to promote cleanliness and proper ventilation. The very moderate sum allowed for its support is furnished by resident missionaries and foreign

merchants, the Chinese merchants and government refusing to contribute, in any way, to its support. The patients generally do well, and the number of recoveries after operations, many of them capital ones, equals our results at home, in defiance of overcrowded wards and other unfavorable surroundings. It is thought still better results would be obtained if the hospital was able to supply more liberally an animal and vegetable diet. It is remarked, by all who have had long professional experience with the Chinese, that they endure surgical operations better and make better recoveries than our own people. Many undergo severe operations without an anæsthetic, and cause the operator no more labor or delay than would occur had that agent been employed. Extreme ignorance, with a feeling of pride, perhaps, when under the surgical treatment of a foreigner, may partly explain this success and heroism, for it is exceptional with them to manifest the least anxiety, either before or after an operation; thus, what might be with us a powerful agent in preventing the proper performance of operations or retarding their recovery is with these patients absent; then it is suggested that our higher order of civilization engenders and fosters conditions less able to resist disease and suffering.

Furniture and bedding are not used in the hospital, further than a board, sufficiently wide for the patient, resting on two wooden frames, a block of wood for a pillow, and the blankets and ordinary clothing of the patient.

Professional services are rendered gratuitously by Drs. Jones and Munson, and to these gentlemen I am indebted for anything of interest this paper may contain. More detailed accounts of diseases selected have been published in the "Customs Medical Reports of China;" but, owing to the limited number published and difficulty of obtaining a copy, I have transcribed, hoping it may prove of interest to others.

In addition to the above foreign medical men, the hospital is

attended by four native students, who reside in the building. Two of these are, from long experience, quite skilled in medical and surgical practice, and are valuable assistants during operations. On Mondays, Wednesdays, and Fridays twenty to forty out-patients are treated, including men, women, and children, and it is estimated that 12,000 yearly receive professional services. Owing to limited capacity of the hospital, only chronic cases and those living miles distant from the city are received.

The chief diseases, and in the order mentioned, are anæmia, leprosy, and elephantiasis. If the views of the able and experienced physicians in charge of the hospital are correct, these diseases could all be embraced under malarial cachexia, this being, in their opinion, the common cause.

ANÆMIA.

With regard to anæmia, the various forms of the cachexia and its local complications are here noted in the following order, viz:

1. *Malarial anæmia, uncomplicated by any local disease.*—As a rule, ague is quickly recovered from, but, if the patient is poor and compelled to work when not able, or starve if unable to work, anæmia, or some other sequela, is sure to follow.

2. *Malarial anæmia and anasarca.*—Anasarca may exist without disease of the kidneys, heart, liver, or spleen; probably by a watery condition of the blood and a debilitated heart.

3. *Malarial anæmia, with enlargement of the spleen.*—This is by far the most frequent sequela of malarial fever. Apart from the fever it accompanies and follows, it appears to be a direct cause of anæmia. By mechanical interference with the circulation it produces stasis of the blood in the legs and abdomen, resulting in edema, ulceration, hæmorrhois, melæna, hæmaturia, acites, dyspepsia, and probably disease of the kidneys. These complications are aggravated, and have an indolent or hemorrhagic character from accompanying anæmia.

4. *Malarial anæmia and ulceration of the lower extremities.*—Next to enlargement of the spleen, ulceration of the leg is the most frequent complication of malarial anæmia. Sometimes the ulceration is independent of splenic tumor, but generally they are combined, the ulcer being partly the result of mechanical obstruction by the latter to the circulation. These ulcers frequently slough, and to such an extent as to quickly destroy life. Reparation is always tedious. Tonic treatment and transplanting, when ulcers present a healthy appearance, generally successful. Local applications, poultices and carbolic-acid oil.

5. *Malarial anæmia and diseases of the kidneys and liver.*—The force of the cachexia may fall upon the kidneys, as in the following case: A man, 32 years of age, has been liable to recurring attacks of ague for six or seven years. Two months before coming under treatment dropsy began. When first seen, the edema involved limbs, face, trunk, and genitals, and there was also some acites. The spleen and heart were quite normal, but heat and nitric acid made his scanty urine quite solid from coagulated albumen.

6. *Malarial anæmia with arrested or retarded development.*—Sometimes the anæmia declares itself in early life, before development is complete; this is arrested, and the individual attacked retains the characteristics of childhood until past middle life.

7. *Malarial anæmia and hemorrhage.*—The subjects of malarial anæmia are very liable to hemorrhage from the nose, gums, kidneys, &c., and from ulcers. Epistaxis is often a prominent feature in certain cases of enlarged spleen. Ecchymosis of considerable extent may follow the bites of insects or other slight injuries. Hemorrhage from spongy gums is not uncommon. Patients, on coming into hospital, are generally prepared for operations, when they are required, by a course of iron and quinine.

8. *Malarial anæmia and dyspepsia.*—The stomach may be the

organ attacked, the yearly-recurring dyspepsia indicating the origin of the disease.

LEPROSY.

This disease is very common in and about Amoy, 7 per cent. of those attending the hospital applying on account of this disease. Leprosy shows itself in a variety of forms, the principal of which are as follows:

1. Anæsthesia of the skin without any apparent alteration in its structure.

2. Pale patches, more or less anæsthetic, having an appearance like the common ring-worm during cold weather. No swelling or alteration apparent to the touch.

3. Tinea-like patches, varying in diameter from half an inch to many inches, of irregular configuration; the margin red, scaly, and slightly ulcerated, abrupt on the sound side, but gradually shading off toward the center, which is usually paler than the healthy skin. These are more or less anæsthetic.

4. Firm hemispherical elevations, varying in size from a pea to a marble, apparently depending on effusion into the derma. Sometimes these are of normal color, sometimes claret-colored; the latter, especially if situated on the legs or feet, are prone to break down and ulcerate; also anæsthetic.

5. Claret-colored brawny elevations of irregularly circular outline and often of great extent; also in the derma; flat on the surface, preserving the same consistence and thickness throughout, and springing abruptly from the healthy skin; generally completely anæsthetic.

6. More or less brawny thickening of the integument of the face and neck; when extensive the skin is thrown into folds and the features acquire the characteristic leonine expression. Frequently this is accompanied by stillicidium, from blocking up the nasal duct or canaliculi, and loss or impairment of the sense of smell, taste, and hearing. Anæsthesia very marked.

7. Bronzing of the skin.

8. Atrophy of the muscles and anæsthesia of the superjacent skin, generally in the hand and fore-arm, and associated with flexure of the fingers and great loss of muscular power.

9. Loss of phalanges from interstitial absorption of bone.

10. Loss of digits, complete or in part, from ulceration or sloughing.

11. Ulcers, generally from injury or breaking down in various places, most commonly on the feet, legs, or hands. The sores are generally of small extent, but when on the soles of the feet very deep, and, unless great attention is paid to cleanliness and the removal of the thick skin in their neighborhood, difficult to heal. Though situated in anæsthetic patches of skin, these ulcers are often very sensitive and painful, especially if deep.

12. Leprous spots are very generally devoid of hairs. The sudoriparous glands lose their functions, but occasionally the sibaceous are unusually active. The only constant symptom is anæsthesia. The arms, hands, face, legs, feet, thighs, neck, abdomen, chest, back, and genitals are affected as regards frequency in the order in which they are here enumerated. Rheumatic like pains, sometimes of a very acute character, often precede or accompany the appearance of the eruption. Change of climate, mercury, potassium, local stimulants, nourishment, the treatment adopted, with some benefit, in Amoy.

Of fifty cases, thirteen attributed their disease to a hereditary taint, four to infection, and in five there was a history of syphilis. Syphilis dismissed as a cause. Ten per cent. of the general population syphilitic, and the lepers are no exception. The disease thought to be hereditary by the natives, and a few believe it to be infectious.

Hankow.—One hundred and twenty-one cases of anæsthesia and seventy-three of leprosy are reported from this place. In ten cases sensory was combined with motor paralysis. When both motor and sensory paralysis are observed in the same

subject they are associated, and hardly ever separately affect distantly-related parts, from which it may be inferred that both lesions originated in some mischief affecting the roots of the nerves. Every part of the general integument appears to be liable to the loss of sensibility, the skin of the hands and feet pre-eminently so, and of all nerves the ulnar. The inference is that the operating cause of the anæsthesia is to be found where the nerves issue from the spinal cord and unite their sensory and motor strands.

The above cases were seen within a period of twelve months at Hankow. During a residence of seven months in Kiukiang, which enjoys a hilly situation and is seldom subject to inundation, not a single case has been seen. Cases are principally drawn from necessarily malarious localities, *i. e.*, where there is no natural drainage.

Of the anæsthetic cases not more than ten or twelve were women, and of the lepers only two. The vast majority of those afflicted followed one and the same occupation, viz, that of agricultural labor, in which they are necessarily exposed to the exhalations of the wet undrained soil in a degree far beyond any other class of residents in the same locality.

Leprosy-anæsthesia, anæsthetic leprosy, and tubercular leprosy are caused by a morbid condition of the blood, caused by breathing the impure air of certain malarious districts, and ague rarely or never affect the same person. It is truly an endemic disease, originating, in all probability, in malaria. Not regarded as contagious leprosy. There is historical evidence that leprosy once prevailed extensively in districts and countries from which it, as well as ague, has now disappeared; and it is thought to be capable of demonstration that the two disappeared simultaneously through the introduction of the modern system of drainage. No treatment successful, and it is thought only an improved system of agriculture will prevent or modify the disease.

ELEPHANTIASIS OF THE SCROTUM.

What was formerly considered a disease of the scrotum, (*sui generis*,) and described as "lymph scrotum," is now regarded as an early stage or modification of elephantiasis, and due to malaria. Notes of many cases are recorded at the hospital by the physicians in charge, and they are found to possess one common character. The history of the disease is as follows: The patient, of any age from 18 to 72, has probably been subject to attacks of malarial fever; usually he has many attacks, but sometimes only one. During a paroxysm of the fever the scrotum and inguinal glands, or, perhaps, the testicle, become inflamed. Such attacks of fever and inflammation may be repeated many times, and usually during one of these an abscess forms in the scrotum. After one of these attacks, the swelling of the parts having somewhat subsided, vesicles are discovered on the surface of the thick and roughened scrotum; after a time one of these vesicles bursts spontaneously, or is opened, and a large quantity of straw-colored, serous-looking fluid escapes. The opening thus made is maintained for several days, and, when about eight or ten ounces or more have run away, heals. The bulk of the scrotum is much reduced by the discharge. After a very few days, however, the fluid re-accumulates, the vesicles refill, and the affected part becomes as large and cumbersome as before. In every case the inguinal glands are enlarged. If the fluid is examined it is found to be loaded with albumen, and to have a specific gravity of about 1010; it coagulates spontaneously, and contains corpuscles similar to those of the blood, the spherical in a much larger proportion than in that fluid, and those resembling the red corpuscles destitute of color and adhesive properties. Should the fluid contain a very large quantity of corpuscles, it might be of a light salmon-color and of a milky consistence. The coagulum has

the property of contracting, in some cases redissolving, and it invests itself with a net-work of delicate red lines resembling dilated capillaries or small blood-vesicles. The precise nature of this strange disease is not determined, but it has been regarded as a sort of lymph-dropsy, caused by arrest of circulation of lymph through the glands appertaining to the lymphatic system of the scrotum; this stoppage of the circulation depending on the thickening and constriction these delicate vessels have undergone during repeated attacks of inflammation of malarial origin. The lymph thus obstructed in its progress toward the blood accumulates in the scrotal lymphatics, dilates them, and continues to some extent the development it has begun, which would otherwise have been completed in the thoracic duct or general circulation. Hence the advanced state of its corpuscles and the striking character of the coagulum. It is supposed that the abscess, which in most cases precedes the disease, may in some way prevent the organization of this lymph into a tissue, as occurs in ordinary elephantiasis. When the disease progresses and causes inconvenience from its great size and weight, the removal of the entire mass is effected. The operation consists in first removing the hypertrophied tissue of the penis by careful dissection, when this organ is affected. Vertical incisions are then made over the testicles, and these organs removed and temporarily secured to the abdomen, when the entire diseased mass is removed. Generally sufficient healthy tissue can be saved to secure a covering for the testicles. The operation is attended with profuse hemorrhage, and the frequent delays to secure vessels make it a tedious one. Five of these operations were performed during the stay of the Yantic at Amoy, and all made good recoveries. The weight of the largest scrotum removed was thirty pounds. Of the many operations performed at this hospital, in one case only did the disease return, so far as the surgeon could ascertain, and this

had been operated on six years before, the tumor weighing fifty pounds. In this case the scrotum was entirely diseased, and the flaps entirely so. Since the return of the disease the tumor is supposed to have reached the weight of twenty pounds. When the disease attacks other parts, little or no treatment is attempted.

Tabular statement of diseases and injuries on board the United States steamer Yantic from January 1, 1874, to January 1, 1875.

Diseases.	First quarter.				Second quarter.				Third quarter.				Fourth quarter.				Total cases for the year.
	Remaining from last quarter.	Admitted.	Discharged to duty.	Continued to next quarter.	Remaining from last quarter.	Admitted.	Discharged to duty.	Continued to next quarter.	Remaining from last quarter.	Admitted.	Discharged to duty.	Died.	Continued to next quarter.	Remaining from last quarter.	Admitted.	Discharged to duty.	Transferred.	Died.	
CLASS I.—*Zymotic diseases.*																			
Order I—Miasmatic diseases:																			
Febris intermittens	...	4	4	..	...	5	4	1	1	4	5	..	..	..	2	2			15
Febris remittens	...	2	2	..	...	.....	.....	..	..	...	.....	..	..	.....	.....	.....	.....	.....	2
Order II—Enthetic diseases:																			
Syphilis primitiva	...	25	5	..	..	1	1	...	...	...	.....	..	..	..	23	4	..	1	11
Syphilis consecutiva	...	...	1	1	1	.....	1	...	...	...	.....	..	..	..	.....	2	..	..	7
Gonorrhœa	...	3	3	..	...	2	2	...	...	2	2	..	..	..	.....	.....	..	..	7
Order III—Alcoholismus	...	3	3	...	...	2	2	...	...	2	2	..	..	..	.....	.....	..	..	7
CLASS II.—*Constitutional diseases.*																			
Order I—Diathetic diseases:																			
Rheumatismus acutus	...	...	...	...	...	1	1	...	...	...	.....	...	...	...	.....	.....	.....	...	1
Rheumatismus chronicus	1	11	10	2	2	9	11	...	...	9	7	...	2	2	4	5	1	...	34
Order II—Developmental diseases:																			
Senectus	...	1	... ...	1	1	.....	1	...	...	...	.....	...	...	...	.....	.....	...	...	1
CLASS IV—*Local diseases.*																			
Order I—Diseases of the nervous system:																			
Cephalalgia	...	5	5	...	...	1	.....	1	1	2	3	...	...	...	1	1	...	...	9
Epilepsia	...	...	.....	...	...	2	2	...	...	...	.....	...	...	...	.....	.....	...	...	4
Melancholia	...	...	.....	...	...	.....	.....	...	...	1	.....	...	1	1	1	.....	...	...	4
Neuralgia	..	2	2	...	...	2	2	...	...	1	.....	..	1	1	2	1	...	...	6
Order II—Diseases of the eye:																			
Conjunctivitis	...	1	1	...	..	.....	.....	...	...	...	.....	...	..	...	.....	.....	..	..	1
Order III—Diseases of the ear:																			

| | | |

Tabular statement of diseases and injuries on board the United States steamer Yantic, &c.—Continued.

Diseases.	First quarter.				Second quarter.				Third quarter.					Fourth quarter.					Total cases in one year.
	Remaining from last quarter.	Admitted.	Discharged to duty.	Continued to next quarter.	Remaining to last quarter.	Admitted.	Discharged to duty.	Continued to next quarter.	Remaining from last quarter.	Admitted.	Discharged to duty.	Died.	Continued to next quarter.	Remaining from last quarter.	Admitted.	Discharged to duty.	Transferred.	Continued to next quarter.	
Vulnus incisum	....	2	1	1	1	.....	1	....	....	1	1	....	....	....	.....	.....	....	....	3
Vulnus punctum	....	1	1	....	....	.....	.....	....	....	.....	.....	....	....	....	.....	.....	....	....	1
Total	4	85	82	7	7	67	70	4	4	72	67	1	8	8	56	58	2	4	284
Average number ship's company	....	147			149				140					140					....
		90 days:			91 days:				92 days:					92 days:					....
Average number patients	....	5 66-90			3 89-91				5 23-92					5 79-92					...
Average sick per 1,000	....	39			27-37				37					41-77					....
Average deaths per 1,000	....	.....			.....				.071					.....					...

REPORT OF J. G. AYERS, M. D.,

Passed Assistant Surgeon U. S Navy.

U. S. S. SACO.

HYGIENE.

Under this head I have nothing further to mention than was included in my report of the previous year, except to recommend that light merino undershirts be furnished to the men for wear in warm weather, those at present issued being too thick for the summer climate of most places on this and other stations.

On the subject of medical topography I have nothing of additional interest to communicate,* but inclose the reports of the colonial surgeon of Hong-Kong for the years 1872 and 1873, and No. 6 of the series of Customs Medical Reports of China, which contain some valuable information.

Thermometrical observations taken at Peking, China, from April 1 to September 30, 1872, inclusive.

Longitude, E. 116° 27′, or 7h 45m 50s; latitude, N. 39° 55′.

Month.	Maximum.		Minimum.		Averages.		Rain-fall.	
	Day.	Night.	Day.	Night.	Day.	Night.	Days.	Amount.
1872.	°	°	°	°	°	°		
April	80	55	53	27	68	45	5	¾ inch.
May	94	67	70	44	82	57	4	1¾ inches.
June	95	73	76	54	88	67	11	4 inches.
July	97	79	76	68	90	73	11	15¼ inches.
August	95	79	70	59	86	66	11	4¼ inches.
September	84	68	62	48	78	60	11	3¼ inches.

REMARKS.—On the 4th of July it rained seven inches in ten hours, three of which were in one hour. The two warmest days were July 20 and 21, equal. The warmest nights were July 16 and August 2.

* See report of Dr. Ayers, United States steamer Saco, 1873.

Thermometrical observations from October 1, 1872, to March 31, 1873, inclusive.

Month.	Maximum.		Minimum.		Averages.		Rain-fall.		Snow-fall.	
	Day.	Night.	Day.	Night.	Day.	Night.	Days.	Amount.	Days.	Amount.
1872.	°	°	°	°	°	°				
October	73	56	54	31	66	44	1	¼ inch.	.....	
November	63	41	23	14	48	27	2	A little.	1	§ inch.
December	47	28	25	8	39	20	.....	.....	2	A little.
1873.										
January	37	23	29	5	31	13	.....	.....	1	A little.
February	57	33	28	9	42	18	.....	.....	2	2 inches.
March	70	41	37	10	53	26	.....	.....	.....	.....

REMARKS.—The only shower of rain on October 17, the day succeeding that of the marriage of the Emperor. An inappreciable amount of snow fell during the two days of December and one of January. March was without either snow or rain. The coldest day was January 13; the coldest night January 29.

Thermometrical observations from April 1 to September 30, 1873, inclusive.

Month.	Maximum.		Minimum.		Averages.		Rain-fall.	
	Day.	Night.	Day.	Night.	Day.	Night.	Days.	Amount.
1873.	°	°	°	°	°	°		
April	84	75	55	31	71	47	4	1 1-16 inches.
May	99	71	68	46	84	57	4	2¾ inches.
June	103	75	70	53	83	67	8	½ inch.
July	100	79	73	62	88	71	16	14 inches.
August	90	76	71	62	80	67	17	13¾ inches.
September	86	70	66	46	78	59	6	2¼ inches.

REMARKS.—The warmest day was June 29, the day on which the foreign ministers had their first audience with the Emperor, when the thermometer showed 103°. From the 29th of July to the 20th of August it rained every day but two, and the rain-fall amounted to 10 inches. *

* The foregoing tables and remarks are taken from the medical reports forming the 6th part of the Customs Gazette for July, August, and September, 1873, published by the Imperial Maritime Customs Statistical Department, Shanghai, China, 1874.

HONG-KONG, CHINA.*

Table showing the annual mean state of the atmosphere during the year 1872, as recorded at the government civil hospital, 86 feet above mean low level of spring tides.

Months in 1872.	BAROMETER.		FAHRENHEIT THERMOMETERS.											WIND.			Rain, in inches, during the month.	Number of days having rain.
	Corrected to 32° Fahren't and reduced to mean sea-level.		Self-registering, in shade.				In shade.			Max. sun-bulb in vacuo.	Max. sun-bulb exposed.	Min. on grass.	Min. in soil six inches deep.	Quarter prevailing.		Movement, during 24 hours, in miles.		
	9 a. m.	3 p. m.	Max.	Min.	Mean. Max.	Mean. Min.	9 a. m.	Noon.	3 p. m.					9 a. m.	3 p. m.			
January...	30.23	30.13	70.0	50.0	62.0	56.0	58.8	61.2	61.4	98.0	75.6	53.7	57.6	E. & N. E.	E. & N. E.	110	0.08	2
February..	30.23	30.14	68.0	43.5	60.4	52.4	55.9	58.7	59.1	101.0	77.5	50.5	54.7	E. & N. E.	E. & S. E.	176	0.66	4
March.....	30.10	30.00	78.0	46.0	69.5	57.4	64.9	66.0	67.7	113.0	88.0	55.2	59.6	E. & N. E.	E. & S. E.	151	0.55	6
April.....	30.00	29.93	84.5	62.0	77.6	70.3	73.4	76.6	76.6	126.0	99.7	68.2	71.0	S. E. & E.	S. E. & S. W.	135	0.99	4
May.....	29.86	29.79	88.0	64.5	83.4	76.0	78.3	81.4	81.8	130.0	104.3	73.2	75.5	S. E. & S. W.	S. E. & S. W.	182	8.53	17
June.....	29.81	29.72	89.5	76.0	86.2	79.6	82.3	84.8	85.3	136.0	109.1	76.3	79.0	S. W. & S. E.	S. W. & S. E.	109	16.27	21
July.....	29.80	29.73	89.0	77.0	87.1	79.9	83.2	86.2	85.7	148.0	118.1	76.5	79.2	S. W. & S. E.	S. W. & S. E.	109	12.19	17
August ...	29.82	29.77	89.0	77.0	87.2	80.9	83.2	86.4	85.8	145.0	114.2	77.3	80.6	S. W. & S. E.	S. W. & S. E.	128	6.75	10
September.	29.94	29.87	89.0	74.0	83.9	76.3	80.6	82.2	82.7	139.0	115.3	73.4	77.3	E. & N. E.	E. & N. E.	496	9.47	12
October ..	30.03	29.94	85.0	69.0	79.4	73.1	75.7	78.2	78.0	124.0	108.4	68.6	72.5	E. & N. E.	E. & N. E.	521	6.38	10
November	30.14	30.03	80.0	58.0	74.2	66.4	69.6	72.8	72.0	123.0	108.0	62.0	66.8	N. & N. E.	N. & N. E.	117	0.05	2
December	30.12	30.03	75.0	56.0	70.[illegible]	63.7	66.7	69.8	68.7	114.0	91.4	56.6	61.2	N. E. & E.	N. E. & E.	288	0.40	2
Mean....	30.01	29.92	82.1	62.7	76.7	69.3	72.7	75.3	75.4	124.0	100.8	65.9	69.5	.....	.....	223	62.52†	107

	THERMOMETER, (FAHRENHEIT.)							RAIN-FALL, IN INCHES.						
	1866.	1867.	1868.	1869.	1870.	1671.	1872.	1866.	1867.	1868.	1869.	1870.	1871.	1872.
Maximum	93.0	92.0	88.0	89.0	89.5	89.0	89.5	77.49	80.80	68.04	63.71	56.07	99.24	62.92
Minimum	45.0	41.0	42.0	43.0	46.0	36.0	43.5							
Range	48.0	51.0	46.0	46.0	43.5	53.0	46.0							

* From the annual report of the colonial surgeon, 1872.

† Total during the year.

HONG-KONG, CHINA.*

Table showing the annual mean state of the atmosphere during the year 1873, *as recorded at the government civil hospital,* 86 *feet above mean low level of spring tides.*

Months in 1873.	BAROMETER.		FAHRENHEIT THERMOMETERS.											WIND.				
	Corrected to 32° Fahren't and reduced to mean sea-level.		Self-registering, in shade.				In shade.			Max. sun-bulb in vacuo.	Max. sun-bulb exposed.	Min. on grass.	Min. in soil six inches deep.	Quarter prevailing.		Movement, during 24 hours, in miles.	Rain, in inches, during the month.	Number of days having rain.
			Max.	Min.	Mean.													
	9 a. m.	3 p. m.			Max.	Min.	9 a. m.	Noon.	3 p. m.					9 a. m.	3 p. m.			
January...	30.16	30.06	76.0	49.0	62.6	54.2	57.4	61.7	58.6	106.4	82.8	46.2	52.1	E. & N. E.	E. & N. E.	271	1.47	5
February..	30.17	30.07	74.0	54.0	65.9	58.8	61.3	65.1	64.1	121.0	96.9	53.2	57.8	E. & N. E.	E. & N. E.	284	.....	....
March.....	30.10	30.01	75.5	54.0	69.3	61.1	63.4	67.4	66.1	125.0	98.4	57.2	60.9	E.	E & W.	336	0.23	2
April.....	29.96	29.88	81.0	56.0	74.7	67.6	71.3	73.8	73.2	121.2	101.6	64.0	68.6	E. & N. E.	E. & N. E.	636	2.19	10
May.....	29.85	29.77	86.0	70.0	81.9	75.1	78.0	80.9	79.6	127.0	106.1	71.4	73.0	E. & S. E.	E.	211	12.27	15
June	29.78	29.72	91.0	71.0	85.3	78.3	82.0	84.4	84.0	128.0	106.7	74.7	76.4	E. & W.	E. & W.	119	6.29	14
July.....	29.76	29.71	91.0	76.0	86.6	79.7	83.1	85.6	84.4	129.0	110.6	74.9	76.3	S. W. & E.	S. W. & E.	103	22.33	18
August....	29.85	29.79	88.0	75.0	86.3	79.3	83.0	85.3	84.1	130.0	114.0	75.6	76.0	E. & S. W.	E. & S. W.	72	15.58	20
September.	29.78	29.72	90.0	76.0	85.4	79.4	82.0	84.4	84.1	134.0	116.3	75.3	76.6	E. & W.	E. & W.	121	12.94	15
October ...	30.04	29.98	84.0	68.0	79.6	74.3	76.1	78.7	78.1	131.0	112.0	68.9	70.1	E. & N. E.	E. & N. E.	122	0.64	8
November	30.19	30.10	78.0	65.0	74.1	68.8	71.0	73.1	72.7	121.0	101.0	55.8	54.4	E. & N. E.	E. & N. E.	124	0.88	2
December	30.18	30.09	74.0	53.0	72.4	62.3	65.5	68.1	67.7	119.0	95.0	41.5	53.0	E. & N. E.	E. & N. E.	144	0.65	2
Mean....	29.98	29.90	82.4	63.9	77.0	69.9	72.8	75.7	74.7	126.0	103.4	63.2	66.1	.....	.....	210	†75.47	†111

	THERMOMETER, (FAHRENHEIT.)								RAIN-FALL, IN INCHES.							
	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.
Maximum.	93.0	92.0	88.0	89.0	89.5	89.0	89.5	91.0								
Minimum..	45.0	41.0	42.0	43.0	46.0	36.0	43.5	49.0	77.49	80.80	80.04	63.71	56.07	99.24	62.92	75.47
Range ..	48.0	51.0	46.0	46.0	43.5	53.0	46.0	42.0								

* From the annual report of the colonial surgeon for 1873.

† Total during the year.

Report of Dwight Dickinson, M. D.,

Passed Assistant Surgeon, U. S. Navy.

U. S. Naval Hospital, Yokohama, Japan.

HYGIENE.

During the first seven months of the year there were attached to the hospital a surgeon and a passed-assistant surgeon; since August a passed assistant surgeon only.

The cubic air-space allowed each individual was fully stated in the report of Surgeon W. M. King for 1873.

During the past year eighty-one patients have been treated, comprising sixty-six from the various ships of the squadron, fourteen from the merchant-marine, and a Russian officer. Four deaths occurred among those first mentioned.

*Ventilation.**—Although the plan of depending alone upon the means enumerated in the report of Surgeon King for 1873 for ventilation is decidedly faulty, yet the extremely unsubstantial manner in which Japanese construct buildings for foreigners, even when carefully superintended, seems to have obviated the difficulty in a great degree. The joints are all loosely put together, the window-frames badly fitted, and the light walls of deal-boards, with tiles and plaster, afford little obstruction to the free passage of air.

As suggested by Surgeon King, movable sky-lights in the center of the ridge of each building, or such means as are employed in the pavilion style of hospital, would have decidedly improved the present condition.

Lighting.—Light is amply supplied.

Warming.—The hospital is warmed by coal-burning stoves,

* See remarks by Surgeon W. M. King, U. S. N., in his report for 1873, *ante.*

one being placed in ward and one in each room of main building; in ward of wing, two; contagious ward, one, and small wood-burning stoves in the two officers' rooms of this structure.

Water.—A well in the hospital-grounds, sixty-seven feet in depth, furnishes a supply of water which has not failed to be sufficient for all wants. A qualitative chemical analysis was given in the report for 1873.

The eighteen wooden reservoirs, in bad condition, have been removed, and in their stead four large iron tanks, of 1,070 gallons' capacity each, substituted. These were obtained from the store-ship Idaho prior to her sale, and will afford greater protection in case of fire, as well as drinking-water for patients suffering from chronic diarrhea.

Food.—The food has been carefully inspected from day to day; the beef, mostly from the country about Kobè and of Japanese cattle, being exceedingly sweet and tender, while the bread furnished by Yokohama bakers has almost universally been good. A large dairy, established the past summer, with cows imported from California, enables us to procure better milk than heretofore.

The high price and scarcity of mutton, it being entirely brought from China, has confined the meat-diet to chickens and beef. The quantity has been in accordance with tables in the book of Instructions for Medical Officers.

Clothing.—Patients have been allowed to purchase of native tailors as their needs required.

CLIMATOLOGY.

Correct and careful meteorological observations have been taken four times daily during the past year, and monthly registers have been kept, which are forwarded with this report.

Synopsis of maximum, minimum, and average monthly temperature, pressure, and humidity, together with the rain-fall, for 1874.

Months.	Temperature.			Dew-point.			Atmospheric pressure.				Rain-fall.
	Max.	Min.	Monthly mean.	Max.	Min.	Monthly mean.	Sunrise.	9 a. m.	3 p. m.	9 p. m.	Inches.
January	53	28	39	49	17	31.30	30.00	30.02	29.98	30.00	1.20
February	56	28	41	45	19	32.00	30.00	30.01	29.97	30.00	1.58
March	69	34	46	58	23	38.75	29.99	30.00	29.98	29.99	7.08
April	74	40	55½	63	21	43.25	29.95	29.95	29.93	29.94	1.68
May	77	49	62	64	40	54.00	29.95	29.95	29.93	29.94	6.77
June	83	60	72	76	49	64.50	29.94	29.94	29.93	29.93	7.04
July	87	67	76	75	61	68.75	29.92	29.93	29.92	29.93	8.40
August	89	65	79	82	55	74.00	29.95	29.96	29.94	29.94	3.91
September	83	61	71	74	50	64.00	29.94	29.98	29.94	29.97	7.20
October	72	43	59	64	36	51.75	30.01	30.03	30.01	30.03	10.69
November	65	39	50	60	29	41.00	30.05	30.06	30.03	30.05	1.94
December	59	32	39	53	37	34.00	30.03	30.05	30.03	30.05	5.40
Total											62.89

Winds.—The prevailing winds during January were northeasterly—force, (calculated in pounds to the square foot,) .31; February, northeasterly—force, .34; March, northeasterly—force, .38; April, northeasterly and southwesterly—force, .78; May, northeasterly and southwesterly—force, .66; June, southwesterly—force, .58; July, northeasterly and southwesterly—force, .18; August, southwesterly—force, .18; September, northeasterly—force, .18; October, northeasterly—force, .34; November, northeasterly—force, .42; and December, northeasterly—force, .17.

MEDICAL TOPOGRAPHY.

Yokohama and its vicinity during the past year has continued comparatively free from disease, either endemic, epidemic, or sporadic. Especially has this been the case in that part of the city known as the bluff, on which the hospital is situated, which has an elevation of one hundred and fifteen feet from the sea-level, and over a hundred feet above the portion designated as the settlement. Malarial fever has prevailed to a slight degree in the last-named spot—in some instances assuming almost a congestive type.

In the month of December variola made its appearance among the natives of Yedo, and has since extended to Yokohama. It is now raging quite extensively in both places, there being over twenty-five patients ill with this disease at the native hospital here, under charge of Dr. Simmons.

For the first time the Japanese government, at least of Yokohama Ken, has made vaccination compulsory, every native being required to have a certificate of vaccination, which is shown officers appointed to inspect the entire city. These certificates are furnished those only who present good cicatrices, and any may be vaccinated once weekly at the native hospital above referred to, where the operation is carried on, virus being transferred from arm to arm, and for which the natives pay the small sum of three tempos, (about three cents.) It is four years since such a serious epidemic of small-pox has occurred.

I know of but one instance of typhoid fever. This was unaccompanied by diarrhœa, and the febrile symptoms disappeared on the twenty-first day of the disease. Typhoid fever was, I believe, entirely unknown until the arrival of foreigners.

The high range of the dew-point and the great fall of rain, as shown by the meteorological report, gives rise to many cases of neuralgia, rheumatism, and pulmonary affections.

During an absence of Dr. Simmons this fall I visited the native hospital in his stead for some eighteen days. There were at that time about fifteen inmates of the institution, with a dispensary attendance averaging twelve or fifteen daily. The surgeon stated that these numbers were unusually small. Nearly one-half the cases treated had their origin in syphilis, comprising muscular, cutaneous, and osseous manifestations of the disease, with affections of the eye and ear. There were also many cases of ophthalmia, in its various forms, and now syphilitic diseases of the skin, accidents, phthisis, bronchial affections, malarial fevers, and kakke or beriberi. According to

Professor Müller, of Yedo, who described this disease about one year ago, the etiology seemed to depend upon marshy lands, high range of temperature, and abundant rains. Dr. Eldridge, late in charge of the government school at Hakodadi, having had much experience, finds it occurring among junk-sailors, men, as a rule, badly fed, hardly worked, and much exposed to the vicissitudes of the weather; also, among the poorer class of women, attacking them only after childbirth, and in such cases almost invariably fatal. Dr. Eldridge's experience is peculiar in this respect, as no mention of the fact is made in works of medicine. An outline of the symptoms was given by Surgeon King, such as great muscular prostration upon the least exertion, anæsthesia of the lower extremities, precordial trouble, including palpitation of the heart and endocarditis. I would add, however, that while anæsthesia of the extremities is present there seems to be hyperæsthesia of the muscles, the slightest pressure being painful, sometimes seen about the muscles of the spine; that the intellectual functions are rarely interfered with, except in coma, which precedes death; that the temperature is, as a rule, lowered; and while but slight interference with digestion at first, in the latter stages there is frequently persistent vomiting. Death is often sudden and unexpected, and seemingly caused by increase of the pericardial effusion or by embolism.

Until recently no *post-mortem* examinations were made of the disease in this country. Dr. Eldridge obtained permission, however, to make one on a prisoner who died of beriberi after an illness of two months in the native jail at Hakodadi, and he has kindly furnished me the following report:

Anasarca.—General, save in the dorsal and lumbar region.

Cranium.—Much congestion of blood-vessels of both dura mater and pia mater; blood very fluid, a condition afterward found to be general. Slight effusion of serum of yellow color

beneath pia mater; brain-substance healthy; two drachms of serum of yellow color beneath pia mater; medulla oblongata normal.

Spinal canal and medulla.—The spinal canal contained much perimeningeal effusion, throughout its whole length, of a deep yellow tint. Cord and membranes apparently normal, except in the lumbar region, where the membranes were intensely congested, and the cord itself enlarged and so softened as to make its removal a matter of much difficulty. Microscopic examination of the cord after hardening in chromic acid revealed that in the lumbar region there was much alteration through its whole extent, as shown by many carefully-made sections. The capillaries were distended, and at many points extravasations into the nerve-tissue had taken place. The nerve-cells proper were bedded in a mass of large oval cells, having two or three nuclei each; some of the cells presenting slight processes at the periphery, as though there had been abortive attempts at polarity. In addition to these large oval cells, there were many having the ordinary characteristics of leucocytes in other situations. The diseased conditions were most marked in the posterior columns of the cord.

Thorax.—Much serum of deep yellow tint in both pleuræ; no adhesions; left lung compressed to a carnified condition, both by effusion in its pleuræ and by that in the pericardium, which latter contained at least two quarts of yellow serum; heart enlarged, dilated, and hypertrophied; white fibrous clot in right ventricle; muscular tissue soft, due to fatty metamorphosis.

Abdomen.—Much peritoneal effusion; liver enlarged to double normal size; marbled appearance; microscope and chemical reagents showed fatty degeneration; gall-bladder, stomach, intestines, pancreas, kidneys, and bladder normal; spleen enlarged and softened.

The treatment generally adopted has been that of stimulants

with quinine and iron, together with the usual diuretic and diaphoretic treatment of dropsy. As a rule it is unsuccessful.

At the native hospital there was a class of twelve medical students, all eager and quick to learn. Opportunity has lately been afforded of dissection.

The number of native hospitals under foreign supervision in the empire has been increased from ten to twelve. Of the 81 cases treated in this institution during the year that has passed, there have been 15 cases of primary and consecutive syphilis, 11 of chronic diarrhœa, 2 of dysentery, 12 of chronic and acute rheumatism, 1 of enteric fever, 1 of malarial fever, and 10 of pulmonary affections, including pythisis, pneumonia, and bronchitis. As heretofore, most of these diseases originated on the coast of China, and a large proportion occur among men shipped on the station, who have contracted maladies before entering the service, men popularly known as "beach-combers."

Immediately opposite the hospital grounds is located the English camp, where a detachment of royal marine light infantry is stationed. They are subjected only to the climatic, endemic, and epidemic causes of disease in Yokohama, and afford a good opportunity for determining the prevailing diseases. The average strength of the battalion during 1874 has been 306; 314 cases in all have been placed on the sick-list; of this number there were no eruptive fevers, 2 cases of ague, 21 of rheumatism, 57 of primary and 40 of consecutive syphilis, with 6 of bubo, 1 of bronchitis, 1 of phthisis, 17 of catarrh, and only 2 admissions with diarrhœa. The number of deaths unusually large for their records, viz: five were mostly accidental, one being a suicide, one a case of drowning, one coup de soleil, one phthisis, and the last bronchitis. Nearly one-third of the sickness in the camp, then, was caused by syphilis,

the largest number of admissions after being those of rheumatism and of catarrh.

The French barracks are situated below the English camp. In April, 1874, the French Naval Hospital was destroyed by fire, and since that time sailors from the various men-of-war of that nationality in the harbor have been treated in the sick-quarters of the marines at these barracks. The number of marines have averaged 100. The total admissions of both sailors and marines to the hospital were 129, sick-days 3,008; 31 were admitted with diarrhœa, mostly originating among the sailors at Cochin-China; 14 with bubo, 10 with bronchitis, 7 with scabes, 8 with syphilis, 6 with neuralgia and rheumatism, 1 with ague, and 1 with variola. Four deaths have occurred.

The English Naval Hospital and the General Hospital have not been visited.

With some difficulty I have obtained the mortality record among the foreign resident and floating population of Yokohama for the year 1874, including the garrisons, hospitals, and ships in the harbor. These are compiled from registers kept at the cemetery, and are shown by the following table:

Disease.	No.	Disease.	No.
Adynamia	1	Liver abscess	1
Albuminuria	2	Laryngitis	1
Aneurysma	2	Morbi valvularum cordis	3
Apoplexy	2	Pericarditis	1
Bronchitis	3	Phthisis pneumonica chronica	8
Cerebritis	2	Pleuritis	1
Convulsions	2	Pneumonia	2
Convulsions, infantile	1	No cause	4
Cholera infantum	1	Natural causes	3
Concussio cerebri	2	Submersio	3
Childbirth	1	Still-born	2
Diphtheria	1	Venenatio	1
Delirium tremens	1	Vulnus contusum	1
Diarrhœa chronica	1	Vulnus incisum	1
Dysenteria chronica	10	Vulnus sclopetarium	2
Febris intermittens	1	Uterine irritation	1
Gastritis	1	Suicide	2
Hydrops	1		
Insolatio	1	Total	75

Nationality.	No.	Nationality.	No.
Austrian	1	Lascar	1
American	13	Portuguese	2
British	26	Russian	4
Belgian	1	Spanish	1
Danish	3	Swiss	2
French	12		
German	9	Total	75

Age.	No.	Age.	No.
From 0 to 20	15	From 50 to 60	2
From 20 to 30	18		
From 30 to 40	24	Total	75
From 40 to 50	16		

As this institution is of limited capacity, chronic and incurable cases have from time to time been transferred to the Naval Hospital at Mare Island, California, for treatment and discharge from the service.

The site of the building is undoubtedly one of the very best in Yokohama, and, in a sanitary point of view, Yokohama seems to excel any other place on the station, the greater and more continuous rain-fall, together with the higher temperature, rendering Nagasaki less desirable. With the greatest deference, therefore, I venture to suggest that this hospital be retained in its present location.

Summary of diseases, injuries, and deaths occurring on board United States vessels of war for the year ended

[The following table, compiled from reports on file in the Bureau of Medicine and Surgery, is a summary of diseases, injuries, and deaths occurring on board vessels of the United States Navy in commission for not less than six months and for the year ended June 30, 1894.]

Order and class.	Disease.	North Atlantic Station.	South Atlantic Station.	European Station.	Pacific Station.	Asiatic Station.	Total.
	Average number on board	10,400	1,340	4,165	6,014	4,444	26,363
CLASS I....	ZYMOTIC DISEASES.						
Order I....	*Miasmatic diseases.*						
	Catarrhus epidemicus	11	9	1	6	9	36
	Cholera epidemica				6		6
	Cynanche parotidea	9		6			15
	Dengue	11				31	42
	Diphtheria	1		9			10
	Erysipelas	10	1	9	7	1	28
	Febris cerebro-spinalis	9		3	1		13
	Febris continua simplex	70	30	60	10	1	171
	Febris enterica	1		10	4		15
	Febris flava	305	3	9			317
	Febris intermittens	5510	40	143	361	1	6055
	Febris recidiva	10					10
	Febris remittens	304	11	10	41	4	370
	Morbilli	9	1				10
	Parotis						
	Scarlatina	1		1			2

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Summary of diseases, injuries, and deaths occurring on board United States vessels of war for 1873 '74—Continued.

Stations.		North Atlantic squadron.		South Atlantic squadron.		European squadron.		Pacific squadron.		Asiatic squadron.		Special service.		School and practice ships.		Coast Survey service.		Total.	
Average number on board		10,446		1,531		3,373		4,335		4,013		2,344		447		104		26,593	
Order and class.	Disease.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.
CLASS IV..	LOCAL DISEASES.																		
Order I....	*Diseases of the nervous system.*																		
	Aphonia	1	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	1	...
	Apoplexia	5	1	1	1	.....	...	3	1	3	...	2	1	.....	...	.....	...	14	4
	Cephalalgia	70	...	25	...	9	...	22	...	74	...	5	..	.....	...	6	...	226	...
	Cerebritis	3	...	.....	...	.....	...	.....	...	1	...	.....	...	.....	...	.....	...	4	...
	Chorea	4	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	4	...
	Dementia	36	...	.....	...	8	...	6	1	.....	...	3	...	.....	...	.....	...	23	1
	Epilepsia	37	...	9	...	15	...	27	...	14	1	15	...	.....	...	.....	...	117	1
	Insolatio	18	...	.....	...	.....	...	10	...	5	...	.....	...	.....	...	.....	...	33	...
	Insomnia	1	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	1	...
	Irritatio spinalis	1	...	.....	...	2	...	10	...	.....	...	.....	...	.....	...	.....	...	13	...
	Irritatio cerebri	.....	...	.....	...	.....	...	.....	...	1	...	.....	...	.....	...	.....	...	1	...
	Mania	16	...	2	...	2	...	6	1	.....	...	4	...	.....	...	.....	...	24	1
	Melancholia	5	...	.....	...	.....	...	3	...	2	...	1	...	.....	...	.....	...	11	...
	Meningitis	2	1	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	2	1
	Neuralgia	96	...	34	...	27	1	67	...	64	...	10	...	1	...	3	...	311	1
	Nostalgia	10	...	.....	...	.....	...	1	..	1	..	1	...	.....	...	1	..	14	...
	Paralysis	7	..	1	...	1	...	8	...	3	..	10	1	.....	...	.....	...	30	1
	Sciatica	1	..	...	...	.....	...	.....	...	...	..	.....	...	.....	...	.....	...	1	...
	Sea-sickness	.....	...	.....	...	.....	...	.....	...	3	...	.....	...	.....	...	.....	...	3	...

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Summary of diseases, injuries, and deaths occurring on board United States vessels of war for 1873-'74—Continued.

Stations.	North Atlantic squadron.		South Atlantic squadron.		European squadron.		Pacific squadron.		Asiatic squadron.		Special service.		Naval School and practice ships.		Coast Survey vessels.		Total.	
Average number on board	10,446		1,331		3,373		4,335		4,013		2,344		447		104		30,393	
Order and class. / Disease.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.
CLASS IV.—LOCAL DISEASES—Continued.																		
Order VI.—Diseases of the respiratory system—Continued.																		
Bronchitis chronica	65	2	12	....	18	....	94	....	57	....	10	....	1	....	....	....	257	2
Catarrhus	130	....	113	....	95	....	136	....	43	....	22	....	....	....	1	....	540	....
Epistaxis	4	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	5	....
Hæmoptysis	6	....	....	....	1	....	5	....	3	....	4	....	....	....	....	....	19	....
Hydrothorax	5	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	6	....
Laryngitis	10	....	3	....	11	....	13	1	5	2	5	....	....	....	....	....	47	3
Phthisis pneumonica acuta	3	....	....	....	2	1	....	....	3	....	....	....	....	....	....	....	8	1
Phthisis pneumonica chronica	46	3	2	....	27	3	19	1	12	....	5	....	2	....	3	....	116	4
Pleuritis	67	....	13	....	14	1	21	....	22	....	2	....	....	....	....	....	139	1
Pneumonia	51	3	5	1	9	1	14	....	1	....	....	1	....	....	....	....	80	6
Order VII.—Diseases of the digestive system.																		
Ascites	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....
Cholera morbus	98	....	5	....	24	1	33	....	35	....	16	....	7	....	3	....	151	1
Cirrhosis hepatis	1	....	....	....	5	....	24	....	32	....	....	....	....	....	....	....	62	....
Colica	69	....	37	....	11	....	98	....	60	....	....	....	....	....	3	....	278	....
Colica pictonum	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	2	....
Constipatio	51	....	24	....	22	....	99	....	24	....	13	....	....	....	....	....	175	....

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Summary of diseases, injuries, and deaths occurring on board United States vessels of war for 1873-'74—Continued.

Stations.		North Atlantic squadron.		South Atlantic squadron.		European squadron.		Pacific squadron.		Asiatic squadron.		Special service.		School and practice ships.		Coast-Survey vessels.		Total.	
Average number on board		10,446		1,531		3,373		4,335		4,013		2,344		447		104		26,593	
Order and class.	Disease.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.
CLASS IV...	LOCAL DISEASES—Continued.																		
Order IX...	*Diseases of the locomotive system.*																		
	Arthritis	3	....	.....	....	6	....	3	....	3	....	.....	....	.....	....	.....	....	15	....
	Anchylosis	3	....	1	....	2	....	1	....	2	....	.....	....	.....	....	.....	....	9	....
	Caries	.....	....	.....	....	.....	....	1	....	.....	....	2	....	.....	....	.....	....	3	....
	Coxalgia	.....	....	.....	....	.....	....	.....	....	1	....	.....	....	.....	....	.....	....	1	....
	Hydrops articulorum	1	....	.....	....	.....	....	2	....	1	....	.....	....	.....	....	.....	....	4	....
	Necrosis	1	....	.....	....	1	....	1	....	.....	....	1	....	.....	....	.....	....	4	....
	Ostitis	1	....	.....	....	.....	....	.....	....	1	....	1	....	.....	....	.....	....	3	....
	Periostitis	6	....	3	....	1	....	1	....	1	....	3	....	.....	....	.....	....	15	....
	Spasmus muscularis	.....	....	.....	....	.....	....	.....	....	1	....	.....	....	.....	....	.....	....	1	....
	Synovitis	23	....	1	....	6	....	16	....	9	....	4	....	.....	....	.....	....	59	....
Order X....	*Diseases of the integumentary system.*																		
	Abscesses	173	....	55	....	62	....	145	....	97	....	42	....	2	....	3	....	579	....
	Acne	3	....	.....	....	.....	....	1	....	.....	....	.....	....	.....	....	1	....	5	....
	Adenitis	36	....	23	....	37	....	79	....	74	....	17	....	.....	....	.....	....	266	....
	Anthrax	9	....	3	....	2	....	17	....	4	....	2	....	1	....	.....	....	38	....
	Ecthyma	1	....	.....	....	.....	....	5	....	3	....	.....	....	.....	....	.....	....	9	....
	Eczema	13	....	6	....	5	....	6	....	5	....	.....	....	11	....	.....	....	46	....

	Epithelioma																			1	
	Erythema					1		4			1									8	
	Furunculus	246		36		110		142		140	28		3							705	
	Herpes			5		1		7		7	1									25	
	Impetigo	3								2										5	
	Lepra										1									1	
	Lichen	26				11		23		16	10		2							88	
	Paronychia	32		5		14		30		8	9		2		2					102	
	Pernio	4		1				4		3	3									15	
	Porrigo					1		1												3	
	Prurigo					1		1		2	1									5	
	Psoriasis			1		3		2		2	1									11	
	Rupia							3			3									6	
	Ulcus	44		15		19		28		45	9		1							161	
	Unguis involutis			1						3										6	
	Urticaria					2		1			1									5	
	Verrugas							2												2	
CLASS V...	NON MALIGNANT TUMORS AND CYSTS.																				
	Adenitis	3																		3	
	Adenoma	3								3										6	
	Condylomata																			1	
	Cystis sebacea																			1	
	Enchondroma	1																		1	
	Fibroma	4																		4	
	Lipoma																			1	
	Sarcoma																			1	
	Tumor	2		8		2		3		3	1									19	
CLASS VI..	VIOLENT DISEASES AND DEATHS.																				
Order I.....	*Wounds, injuries, and accidents.*																				
	Abrasio	51		13		12		27		21	6									131	
	Ambustio	57		13		19		30		27	7				3					156	
	Amputatio																			1	
	Concussio cerebri	25	1	1			1	22	2	6	1									60	5
	Contusio	397		64		95		166		12	69		22		3					248	
	Explosio												4							4	
	Fractura	58		17		14	2	28	1	24	14									155	3
	Frost-bite										1									1	
	Hernia	57		8		19		13		9	1		1							108	
	Luxatio	51		28		23		35		30	7		9		2					185	

Summary of diseases, injuries, and deaths occurring on board United States vessels of war for 1873-'74—Continued.

Stations.		North Atlantic squadron.		South Atlantic squadron.		European squadron.		Pacific squadron.		Asiatic squadron.		Special service.		School and practice ships.		Coast-Survey vessels.		Total.	
Average number on board		10,446		1,531		3,373		4,335		4,013		2,344		447		104		26,593	
Order and class.	Disease.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.	Cases treated.	Deaths.
CLASS VI..	VIOLENT DISEASES AND DEATHS—Continued.																		
Order I.....	*Wounds, injuries, and accidents*—Continued.																		
	Stremma	105	....	17	....	44	....	59	....	58	....	2	....	.....	....	.....	....	285	....
	Submersio	5	3	.....	....	3	2	3	2	6	5	.....	....	.....	....	.....	....	17	12
	Venenatio	3	1	.....	....	.....	....	1	....	.....	....	.....	....	.....	....	.....	....	4	1
	Vulnus contusum	213	1	71	....	99	....	111	....	144	....	44	....	8	....	.....	....	690	1
	Vulnus incisum	108	....	29	....	48	....	67	....	35	....	25	....	4	....	2	....	318	....
	Vulnus laceratum	50	....	18	....	21	....	44	....	21	....	5	....	8	....	.....	....	167	....
	Vulnus punctum	55	....	7	....	11	1	33	....	17	....	8	....	3	....	1	....	135	1
	Vulnus sclopetarium	7	....	.....	....	1	1	4	1	1	....	.....	....	1	....	.....	....	14	2
	Vulnus venenatum	2	....	1	....	.....	....	1	....	1	....	.....	....	.....	....	1	....	6	....
Order II....	*Homicide*	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....
Order III..	*Suicide*	.....	..	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....
Order IV...	*Execution*	.....	..	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	..	.....	....
	Total	6,378	36	1,298	7	2,276	25	3,647	22	3,763	24	1,260	5	292	....	100	....	18,924	119

PART II.

MISCELLANEOUS CONTRIBUTIONS

FROM

MEDICAL AND OTHER OFFICERS OF THE UNITED STATES NAVY.

NOTES ON MEDICAL TOPOGRAPHY AND GENERAL HYGIENE,

FROM

OBSERVATIONS IN THE SOUTH ATLANTIC SQUADRON.

By JOSEPH WILSON, M. D.,
MEDICAL DIRECTOR U. S. NAVY,
SURGEON OF THE FLEET, FROM JUNE, 1869, TO MAY, 1872.

In accordance with instructions to medical officers, contained in a circular from the Bureau of Medicine and Surgery, Navy Department, July 7, 1869,* the following report of notes on hygiene, medical topography, &c., is made in compliance therewith.

HYGIENE.

The following tables give a summary statement of the sick of the several vessels of the South Atlantic fleet for the thirty months of my service as fleet-surgeon, (from June, 1869, to May, 1872:)

Summary of aggregate reports.

South Atlantic fleet.	Mean force.	Number of patients.	Number of sick days.	Deaths.	Invalided.	Average patients per 1,000 per annum.	Average daily sick-list per 100.	Average deaths per 1,000 per annum.	Average invalided per 1,000 per annum.
Fourth quarter, 1869	864	230	1,670	3	1	1,065	21.09	13.89	4.63
First quarter, 1870	865	350	3,395	1	15	1,618	43.84	4.62	69.36
Second quarter	714	232	2,492	..	2	1,268	32.32	.....	11.25
Third quarter	722	309	2,722	2	5	1,717	40.96	11.08	27.70
Fourth quarter	723	154	2,048	2	9	853	30.79	11.08	49.86
First quarter, 1871	688	153	1,681	3	4	889	30.38	17.44	23.22
Second quarter	677	164	1,597	3	4	969	25.92	17.73	23.60
Third quarter	702	193	1,655	....	8	1,083	25.02	.....	45.58
Fourth quarter	703	281	2,015	....	3	1,599	31.15	.....	17.07
First quarter, 1872	699	221	1,501	....	2	1,265	23.60	.....	11.44
Aggregate, ten reports.	736	2,287	29,976	14	53	1,243	31.20	7.61	29.91

*[Circular.]

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., July 7, 1869.

The medical officers of the Navy are invited to forward to the Bureau of Medicine and Surgery, with a view to publication, any reports or essays on

Sanitary condition of individual vessels.

Names of vessels.	Number of quarterly reports.	Mean force.	Number of patients.	Number of sick-days.	Deaths.	Invalided.	Average patients per 1,000 per annum.	Average daily sick-list per 1,000.	Average deaths per 1,000 per annum.	Average invalids per 1,000 per annum.
Lancaster	10	419	1,351	12,674	3	38	1,322	32.6	2.86	36.29
Portsmouth	7	196	386	3,957	10	9	1,126	31.52	29.11	26.26
Ticonderoga	3	223	216	1,323	....	4	1,275	21.57	.....	23.92
Quinnebaug	2	130	35	337	...	...	538	14.24	.....	.....
Wasp	10	87	299	2,085	1	2	1,421	33.80	4.54	9.08
Aggregate	10	736	2,287	20,976	14	53	1,243	31.20	7.61	29.91

Sick-rate.—In examining these tables, we first note that sickness did not prevail in any particular season; but during the first year all the reports show more than the average number on the sick-list; during the second year, considerably less than the average; and subsequent reports exceed the average again. The sick-list has been about 3 per cent., (31.20 per 1,000.)

Death-rate.—The highest death-rate, the greatest number of deaths, does not coincide with the highest sick-rate, but rather the contrary, eight of the fourteen deaths having actually occurred during the year of the fewest admissions to the sick-list. The death-rate on this station has been about 50 per cent. more than the average death-rate of vessels of the Navy afloat; the deaths in these tables being at the rate of 7.61 per 1,000 mean force per annum, and of the Navy afloat, as exhibited in reports of the Bureau of Medicine and Surgery, about 5 per 1,000. This high death-rate we further observe is entirely due to the large proportion of deaths on board the Portsmouth, ten of the fourteen deaths having occurred on board that vessel. The deaths were mostly from violence—falling from aloft,

professional and allied scientific subjects that they think convey valuable and useful information. * * * * *

WM. MAXWELL WOOD,
Chief of Bureau.

blows on the head, and drowning. There were two deaths from small-pox and one each from yellow fever, remittent fever, pneumonia, and phthisis. It may be well to inquire into the cause of this excessive number of deaths.

The Portsmouth is probably the very best ship in the Navy, for model, spars, and rigging. The crew were such men as usually pass the rendezvous—picked men for health and muscles, but not much for morals—healthy men who fail to find better employment. Some men thus fail because they are known to be criminals by all who know them at all, hence there were probably among them as bad men as any out of the penitentiary; some fail on account of worthless laziness, and some because they are not good-looking, and as mere strangers have nobody to recommend them; some fail through weakness of intellect nearly amounting to idiocy, which cannot always be detected at the rendezvous. A few young men are brought into the Navy by romantic notions of the ocean; and some boys are enlisted as apprentices by step-fathers or cruel or befooled uncles. In short, the Portsmouth's crew was made up of such young men as are usually found aspiring to serve their country as soldiers and sailors in time of peace. The mortality, however, was six times the average of vessels in commission for sea-service.

The discipline on board this vessel seems in some respects to have been unusual. Early in the cruise desertions were prevented by "securing for the night" such men as were caught in the attempt. They were secured in the evening by chaining them by the legs to a shot-rack, and they were released in the morning for their usual work; thus they were secured in a row every night. I do not know whether this arrangement lessened the disposition to desert, but it surely did not promote sound sleep or the feeling of satisfactory comfort, and these we usually consider necessary to health and useful energy. The punishments, though apparently quite in accordance with law, were

not such as could be supposed to promote physical health. The most common of the punishments recorded was "five days' solitary confinement on bread and water."

In the interest of health and good order in the Navy, I would suggest that specially-inclosed apartments for prisons should no longer be built on board the vessels of the Navy, and that the sweat-box should no longer be allowed. Usually the best and most available prison on shipboard is an allotted space between two guns; the orlop passages may likewise be used, or a vacant space in the hold; and it may occasionally be convenient to confine an obstreperous drunkard in a well-ventilated vacant store-room for a few hours till he gets sober. For strong external prison-walls, the sides of the ship and the broad ocean are amply sufficient.

There appears to be some misapprehension as to the intention and meaning of General Order No. 128.* The direction to report "time" occupied in each evolution, in some instances, seems to have led to a system of racing the crew against the

*[General Order No. 128.]

NAVY DEPARTMENT,
Washington, D. C., June 11, 1869.

* * * * Commanders of squadrons will direct that constant exercises shall take place with sails and spars. Where the vessels of a squadron can be kept together it is desirable that they should be exercised together, to create a spirit of emulation in the Navy. These exercises will be kept up when vessels are acting singly.

Commanders of squadrons will require that all vessels are proficient in the following exercises: Sending up and down royal and top-gallant yards; sending up and down top-gallant masts; sending up and down top-gallant mast, lower yards, and topmasts at one time; shifting top-sail; shifting jib-boom; bending and unbending sail; furling sails from a bowline; getting under way from single anchor, with all sail set; coming to single anchor and taking in all sail together; mooring and unmooring ship; getting in and out boats; shifting topmasts; shifting three top-sails at one time; shifting courses at one time; reefing top-sails and courses.

A quarterly report will be made to the Department of all such exercises as may be performed, stating the time occupied in each evolution.

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A. E. BORIE,
Secretary of the Navy.

second-hand of a watch, instead of instructing them. The first requirement of the order is that the crew shall be proficient; shall learn to do the evolution well. After an evolution is well understood, and the warped places about the masts, &c., planed and scrubbed, so as to work smoothly, there seems to be no harm in racing men occasionally, even at such work as raising or lowering a spar weighing several tons; but it must be borne in mind that a sailor, like a horse, cannot run a hard race several times a day or several days in succession without serious injury. Some of the very best iron-work, such as top-bolts, may be destroyed in the beginning of a cruise by allowing a strong force of men to run away and bring on such iron-work a strain altogether disproportioned to its intended strength. This subjects the lives and limbs of men on deck to great risks.

Attention is called to paragragh 196, Navy Regulations,* which appears to be a dead-letter. As armed vessels are provided with men enough, not only to work the ship, but to man the battery at the same time—four times as many as are required in merchant-ships of similar dimensions—it is supposed that sometimes the crew may be divided into three watches "without detriment to the service." When this cannot be done, men in "watch and watch" should not be kept out of their beds by "night-quarters" any more than is necessary to teach them such duties as cannot be so well taught in the day-time.

EPIDEMICS.

Small-pox.—The South Atlantic fleet, in 1870 and 1871, suffered disproportionately from small-pox. At Montevideo, on account of insufficient attention to vaccination, the disease generally prevails, and as this is much the best place for our men to enjoy liberty on shore, some risk of this disease was una-

* When it can be done, without detriment to the service, the commanding officer will divide the crew into three watches.—(Paragraph 196, United States Navy Regulations, 1870.)

reliable. Our vaccinations on shipboard have almost universally failed, partly because the men were pretty well protected before, and partly for want of fresh vaccine material.

On board the flag-ship Lancaster there were two cases. The first occurred at Montevideo, April, 1870. The patient had been on shore on liberty April 6; came on the sick-list April 23, having been unwell three or four days previously; appeared to have typhoid fever, and was placed in a cot in a range with other patients, the cots being four feet apart from center to center. His back-ache was suspiciously severe on the 25th, and a rather profuse crop of milliary eruption about the head and neck, April 26, left no doubt of the nature of the attack. The patient was promptly transferred to the British Hospital, whence he returned May 18 quite well. There was no further appearance of the disease at this time. The second case of variola occurred about a year afterward, May 22, 1871, at sea, ten days after sailing from Montevideo. This patient had been two days in a cot very near two other men when the eruption was recognized. He was promptly isolated by making a tent for him in the steam-launch, and on the 25th, when transferred to the hospital at Rio de Janeiro, he had a full development of distinct pustules all over his body. He returned from the hospital quite well June 19. These two cases go to support the opinion that the spread of small-pox by contagion may sometimes be prevented by the careful isolation of cases as soon as the eruption is recognized.

On board the Portsmouth, during the third quarter of 1870, there were seven cases of variola and varioloid. This is referred to infection received at Montevideo; and the first cases occurring at sea, it was found impossible sufficiently to isolate the patients. During the first and second quarters of 1871 the Portsmouth had another visitation of this pestilence, with an aggregate of six cases and two deaths.

Yellow fever.—Some of the cities of South America suffered greatly from yellow fever during the years 1870 and 1871; but our ships were comparatively free of the pestilence. The Portsmouth suffered somewhat each year; and the cases of disease were distributed among officers and crew in such proportions that the effects of various degrees of exposure are capable of tolerably definite appreciation, and thus afford valuable material for establishing hygienic rules. The following table exhibits in figures the most important facts:

Cases of yellow fever on board the United States steamer Portsmouth.

Classes of men exposed.	Rio de Janeiro, May, 1870.			Bahia, April, 1871.			Aggregate.		
	Number of men.	Cases of yellow fever.	Cases per 1,000 mean strength.	Number of men.	Cases of yellow fever.	Cases per 1,000 mean strength.	Average mean strength.	Cases of yellow fever.	Cases per 1,000 mean strength.
Commissioned officers	14	5	357.14	12	3	250.00	13	8	615.38
Warrant-officers, &c	6	2	333.33	5	....	.....	6	2	333.33
Gig's crew	6	....	.....	6	1	71.43	6	1	71.43
Cutter's crew	22	....	.....	22	1		22	1	
Other enlisted men	146	5	28.74	149	8	53.69	147	13	88.44
Total	194	12	61.86	194	13	67.01	194	25	128.35

It is hence apparent that on both occasions the officers suffered much more than enlisted men; in 1870 the twenty officers presenting more cases than 174 men. The appointed and warrant officers suffered considerably less than the commissioned officers, and entirely escaped in the second epidemic. The boats' crews suffered less than the other men, and entirely escaped in the first epidemic. The commissioned officers suffered in the proportion of 615 per thousand, nearly two-thirds of the whole number having had the disease; and if the enlisted men had suffered in the same proportion, instead of fifteen cases we should have had one hundred and eight cases among them.

Conclusions.—This table tells pretty plainly its own story. The commissioned officers suffered most; they were most on shore in the infectious places; some men who were not out of the ship at all suffered. The infection, though in less virulent form, must have existed on board; the boats' crews, though often on shore, suffered less than the other men; they had good exercise every day, away from unventilated corners of the ship, as well as the infectious places on shore. This large proportion of yellow-fever cases among the officers is the rule of the naval service.

Sanitary regulations.—On the commencement of the cruise, I proposed sanitary regulations with special reference to this pestilence. These regulations were in accordance with the undoubted fact that the risk of disease is somewhat in proportion to the time of exposure to the miasmatic atmosphere; and if nearly all the time, especially the night-time, is spent in a pure atmosphere, the risk of infection is not great. Thus, visits to the shore were allowed, especially in the day-time, for business or even social visiting, but visits to infected cities were prohibited, when the object was merely to be out of the ship, lounging about taverns and worse places. The first case of yellow fever was an officer who boarded by the week at a hotel in Rio de Janeiro, in violation of the spirit of the order of the admiral, and without any motive, so far as I heard, except to be in the society of a certain Frenchwoman. These regulations were criticised in Washington, and the commandant was informed, "If you should issue such an order, you could hardly be said to command the squadron." The signature to this must have been obtained by slyly placing it in a pile of letters mostly referring to matters of formal routine.

Interesting epidemic.—There is a variety of yellow-fever poisoning which seems not to be generally understood; at any rate, not generally insisted on. I allude to the numerous cases of

light febrile disease which precede the development of the fully-formed fatal cases of yellow fever, usually noticed as the first cases of an epidemic. Every writer on epidemic cholera tells us of the numerous cases of diarrhœa preceding the epidemic; but no one describes these numerous cases of slight febrile disease which are the harbingers of the yellow-fever epidemic.

In the month of January, 1870, the United States flag-ship Lancaster for twenty days was anchored in the harbor of Rio de Janeiro, the city being represented as quite healthy; no unusual sickness; a few deaths from yellow fever; nearly all of strangers and sailors living near the wharves. About the time of sailing, there was observed a curious epidemic of febrile disease, with no special character except a slight febrile action and weakness—an inability to labor. In a crew of four hundred and thirty men, there were nineteen of these cases on the sick-list in the course of two months. The first four cases are recorded in the sick-journal as febris simplex, one as febris continua, and the remaining fourteen as febricula. Fifteen of these cases terminated in health in less than a week—one to six days. The four most severe cases lasted twelve, sixteen, nineteen, and fifty-six days respectively. The case designated as febris continua certainly had no distinct characteristic of typhoid fever; none of them had any intermittent or remittent character; none of them resembled the terrific pestilence we call yellow fever; but all of them were doubtless the result of yellow-fever poisoning, with the miasma diluted by the distance of our anchorage, about a mile from the shore. We probably escaped a severe epidemic by sailing immediately to the cold region of the Falkland Islands.

MEDICAL TOPOGRAPHY.

A physician can hardly move from one place to another without observing peculiarities of location which are certain to influ-

ence health to a very great degree, though it may not strike him that there is anything worthy of note. The elements of such observation are usually so few and so regularly associated that most of them have been found in other places many times before. Hence there is apt to be a good deal of commonplace repetition about descriptions of this kind. I shall endeavor not to be prolix or tedious in this part of my subject.

NORFOLK, VA.

The first place calling for remark is the Norfolk Station, where the flag-ship Lancaster, in 1869, fitted for sea. The land about this place is flat and marshy, probably without a spot thirty feet above the level of the ocean within fifty miles. Of course the whole region is pestilential with malarial fevers. There are some spots exempt from the infection—the built-up parts of Norfolk City, the naval-hospital grounds, protected by a grove of pine-trees, and perhaps a few other favored spots. Work at the navy-yard is greatly interfered with by ill-health and want of energy among the workmen, and the families of officers deem it prudent to be absent a part of the summer. It is well known that tracts of pine-wood, such as the pine-barrens of this region, are quite exempt from the malarial infection, and I am under the impression that this place is less healthy than formerly, on account of the destruction of pine-trees during the war. Various commissions have, from time to time, recommended the purchase of land contiguous to the navy-yard, with a view of getting it for prospective extensions while it may be had cheap. I would not recommend the purchase with any such view, though there is no knowing how high corner-lots may sell on the Broadway of this future commercial metropolis. I would recommend the purchase whenever the owners are disposed to sell it at a fair price, in order that it may be sown with pine-seeds, and that the navy-yard

may thus be made as healthy as the naval hospital. The absence of shade-trees about the avennes of this navy-yard, considering the long time it has been occupied, is really a wonder. I would not recommend the expenditure of much money for planting shade-trees; it only requires such good sense and good taste as prompted the planting of rows of pride of India (*Melia azedarach*) along the roads and paths of the Pensacola navy-yard. The labor of planting and tending these trees could very well be done by a gardener or two now busied digging up grass from the cart-roads. Their present work is a positive injury, increasing the heat and glare of bare sand so as to damage the eye-sight, and to make a walk from one part of the yard to another a rather serious undertaking. The young trees need cost nothing, as the seeds may be had by the bushel in the neighborhood, even in the navy-yard, for the mere trouble of picking them up. A nursery-row of these trees would be both ornamental and useful in the navy-yard.

MADEIRA.

The first foreign port visited was Funchal, island of Madeira, (November, 1869.) This cannot be otherwise than a healthy place. It has steady, gentle breezes from the ocean; the rocks are primitive and volcanic, granite, trap, tufa, &c. Everywhere the soil is permeable to moisture down to the basement-rock. There are no sluggish streams through flat meadows. The climate is equable; the mountain-roads steep; so that at any time, by a ride on horseback of about an hour, you travel from gardens of bananas to natural groves of chestnut. There are many deaths here from pulmonary consumption—invalids from various countries. The only endemic noticed here is elephantiasis arabum, and this is one of the very few places in which this disease occurs in the temperate zone. This is a most delightful stopping-place for ships passing in the neighborhood.

Bahia, Brazil.

We arrived at Bahia in December, 1869, and remained about a week. The city appeared to be in excellent sanitary condition; it being impossible, by diligent inquiry of the boarding-officer, to hear that more than two persons had died within the memory of man, though the city is represented to contain about 200,000 inhabitants. For the purpose of description, this place may be divided into Bahia on the hill, and Bahia under the hill. Bahia on the hill being about two hundred feet high, as will be anticipated, is a pretty comfortable place, well situated for health and enjoyment, except as it happens to be situated in a moist, hot climate. Bahia under the hill is a narrow level strip of land along the beach, part of the way having merely width for one narrow dirty little street, and part of the way it is wide enough for three or four streets —crooked, narrow, dirty, crowded, nasty. Bahia under the hill must be a perfect pest-hole. Yellow fever generally prevails here in March, April, and May, and, as they say, principally among foreigners and sailors.

This is an excellent place to procure tropical fruits and vegetables. The yam (*Dioscorea batatas; ynhamè*) is here found in perfection. There is abundance of excellent water for the shipping, but the water-boats, unless watched, are apt to bring stagnant water from a neighboring marsh.

Rio de Janeiro.

We anchored in the harbor of Rio de Janeiro in January, 1870, and visited it subsequently several times during the cruise. This the most magnificent bay in the world is surrounded by high mountains, too irregular in form to be volcanic cones, perhaps too high to be anything else. The peaks to the north and west are called Organ Mountains, from a fancy that their summits bear some resemblance to the pipes of a church-

organ. The city is mostly on a level plain, originally a marsh, but little elevated above the level of the ocean—portions of the marsh extending irregularly in various directions between the mountains. Whenever space is wanted for buildings, it is filled up a yard or so with gravel, and suitable surface-drains are made to carry off superfluous water. In some parts of the city there is a regular system of under-ground sewers. The growth of the city has brought into use the sloping sides of some of the mountains for building-lots; and the roads following valleys and streams between the mountains lead to picturesque suburban villages. Some situations on the shores of the bay are still more attractive. The rock met with about here is mostly granite; the soil has a base of transported material, bowlders and coarse sand, occasionally consolidated into a very soft sandstone, which may be cut with a spade. This kind of subsoil is very permeable to water, so that nearly all the vast amount of rain that falls here filters down to the granite, and never rises in springs, except on a surface of granite rock. The mountain-streams are all on the granite rock, sometimes concealed by an accumulation of bowlders. There seems to be no clay to form level meadows and ponds; no sluggish streams, or lakes, or marshes, except nearly on a level with the ocean. This permeable subsoil gives to the country almost perfect natural drainage; so that, for a tropical country, the neighborhood of Rio de Janeiro must be the most healthy country in the world. The plain on which the city is built is of the same permeable material, so that with a very small amount of expenditure for sewers the city of Rio de Janeiro is well-drained as far as the improvements extend. It is a well-drained and healthy city.

Malarial fevers have prevailed here in nearly all parts of the city; but as the grading, pavements, and buildings extend these diseases leave for the suburbs. I observe in the mor-

tuary reports many deaths from pernicious fever; this form of disease prevailing in the neighborhood of unimproved portions of the marshy plain.

Yellow fever is endemic here to such a degree that the city is probably never without cases of the disease. This is generally considered of small account, and the city is reported as quite healthy in this respect until the deaths become sufficiently numerous to create some degree of popular excitement, and then it is regarded as prevailing epidemically. During our first visit, in January, 1870, the city was reported quite healthy, though there were deaths from yellow fever every day.

I find in the Anglo-Brazilian Times, August 22, 1870, a statement of deaths, &c., from statistical returns by Dr. Luiz da Silva Brandaõ for the six months ending June 30, and have added some computations, assuming the population to be 400,000, and the number of foreigners in the proportion of their deaths from other causes than yellow fever, as follows:

Rio de Janeiro.	Population.	Deaths.	Deaths per 1,000 per annum.
Population	400,000	5,525	27.625
Natives	257,000	3,116	24.25
Foreigners	143,000	2,337	32.69
Deaths from yellow fever		996	4.98
Deaths from yellow fever ....natives..		127	.984
Deaths from yellow fever ....foreigners..		869	12.154

Deaths from yellow fever, males, 911; females, 85; freemen, 991; slaves, 5.

The deaths from other most prevalent diseases were, phthisis pulmonalis, 779; tubercles, (enteric,) 395; tubercles, (mesenteric,) 152; fevers, pernicious and typhoid, 386; apoplexy, 218; convulsions, 192; heart-diseases, 209; diarrhœa, 141; pneumonia, 126; trismus nascentium, 138; still-born, 216.

It is hence apparent that the death-rate of Rio de Janeiro is

twenty-seven per thousand per annum, which is rather more than the death-rate of the city of London. The native population is much more healthy than the foreign. The natives were nearly exempt from yellow fever, as they suffered less than one death per thousand from it, while the foreigners died at the rate of twelve per thousand from this pestilence. The comparative exemption of females and of slaves, is curious. The very large number of deaths from tubercular diseases is really astonishing. The above estimate of population is probably much too high; the very imperfect census of 1870 makes it 250,000; perhaps it is between 300,000 and 400,000.

Rio de Janeiro, directly in the route of nearly all long voyages, a large city replete with conveniences for repairs, must always be the great maritime stopping-place. Floating tanks bring excellent water to the shipping at a moderate price, but they require some watching, as bad water is easily found in the neighborhood. There is a profusion and great variety of fruits and vegetables. The most valuable of the starchy vegetables is the yam, here called *caraï*, the tuber of the *Dioscorea batatus*. When cooked, it is not to be distinguished from the best potatoes, and it keeps very much better than potatoes on shipboard. This vegetable must not be confounded with the *Caladium esculentum*, here called *ynhamè*, (in-ya-me,) which is an immense starchy corm, weighing as much as a hundred pounds, and excellent food when properly cooked; but it is full of the irritating material peculiar to araceous plants. This is important, for the yam (*caraï*) is very desirable for sea-stores, while the *Caladium* (*ynhamè*) is to be avoided as a dangerous poison. In stopping at Rio, it is well to bear in mind that yellow fever always exists there to some extent, and the assurance that it is nothing, only affects strangers and sailors, should not lead such strangers to reckless exposure. During the stay passengers and such others as are not necessarily present on board ship should spend the time

at Petropolis, about 3,000 feet high, in the mountains. This place is reached in about three hours, and is, perhaps, the only place in Brazil where comfortable boarding for a week can be obtained. Even during an epidemic a short stop at Rio is not very dangerous to a vessel passing south, for cold latitudes will be reached before the disease has time for development.

SANTOS, BRAZIL.

The flag-ship Lancaster visited the port of Santos in October, 1871. This is a beautiful harbor, the river being deep, very clear of obstructions, and so narrow as to be comfortable for the movement of boats in all kinds of weather. The town is situated on a rather narrow plain, between a mountain and the river; not a very encouraging prospect for those seeking a healthy place. The marshy land immediately south, for three or four miles, is so much under water every high tide that it is probably not very malarious. The town seems to be extending in this direction by the building up of as much land as is necessary for the contemplated houses. The marshy plain north, extending toward the mountain-range, is not so much under water, and there appears very little disposition to build on it; probably experience, one of the great teachers, has convinced the people that whoever attempts to live on this marshy plain quickly dies of malarial disease. Santos is very rainy, like nearly all Brazil east of the coast range, and the mosquitoes, by all accounts, are somewhat prodigious.

Santos is not well supplied with stores and conveniences for refitting and extensive repairs, but it is very important as one of the principal shipping-ports for coffee. A railroad extends about a hundred miles into the interior; at the end of the first twenty miles the road reaches the summit of the coast range, 2,600 feet high, by a series of inclined planes five miles long. Immediately after passing the summit the climate improves,

the amount of rain is moderate, and the streams flow to the westward into the Tieute River, and thus reach the ocean through the La Plata. This magnificent country communicates with the commercial world through the port of Santos.

San Paulo, Brazil.

San Paulo, the capital of a province of the same name, is on the line of railroad, forty-three miles from Santos. It is situated in a beautiful rolling country, well watered by a sufficient amount of rain, and drained by the sources of the Tieute River. Being upward of 2,000 feet above the level of the ocean, it enjoys a delightful climate, with light frosts and even a little snow in winter. This is a very healthy country, with very little malarial fever.

In proceeding westward we reach Jundiahi, a very rural village, with ox-carts ingeniously contrived to creak so loud as to be heard for several miles, and Campinas, the capital of another province. These places are similar in climate, topography, and diseases to San Paulo. But the Tieute and its branches have more valleys and broader as we proceed westward, and there is a corresponding increase in the amount and severity of the malarial diseases. Many fatal cases of pernicious fever occur about Campinas.

General remarks.—Brazil is too extensive a country to have much said of it which may be universally applicable in regard to climate and diseases, though there is much uniformity of conditions in nearly all the places we have visited. It is mostly in the torrid zone, and hence it is warm. There is a mountain-ridge nearly parallel with the coast, twenty or thirty miles distant, 2,000 to 8,000 feet high, dividing the small streams of the coast from the sources of the great interior rivers. The breezes are generally from the ocean, so that an immense amount of water is deposited on the eastern slope of this coast range, and

the atmosphere is excessively damp. Of course, there is great difference in diseases, as well as climate, between the eastern slope of this range and the interior elevated districts. The eastern slope, being mostly steep mountain-sides, washed by a superfluity of rain, free from stagnant ponds and marshy plains, suffers comparatively little from malarial diseases. It is hard to say to what extent the tubercular phthisis of Rio de Janeiro may be owing to the dampness and calm weather of the eastern slope. Several places about the summit of the mountain-range, and a short distance beyond it, are the resorts of invalids during the heat of summer.

Endemics.—There are several terrible endemic diseases rather prevalent in Brazil. Three very distinct forms of disease, so far as we know wholly incurable, are called lepra, (leprosy:) (*a*) Lepra elephantiasis, elephantiasis arabum; (*b*) lepra tuberculosa, the elephantiasis græcorum, a tubercular degeneration of the skin with bran-like desquamation; (*c*) lepra anæsthetica, dry gangrene.

Dry gangrene.—The dry gangrene here seen differs somewhat from the disease as usually described and as we have seen it elsewhere. It does not specially attack old people. It is not the plugging up of a large artery so as to destroy a whole limb by one attack of disease, but it commences in all the extremities very nearly at the same time, and trims them off gradually and somewhat systematically. It generally commences in the small toes of both feet, or the little fingers, and it destroys one joint after another of all the fingers and toes in succession, according to their relative size, the thumbs and large toes remaining longest; next go the hands at the wrists, or the feet at the ankles, &c. In the beginning there is often to be seen a pale anæmic circle, perfectly blended at the margin, on some part of the affected limb, indicating the embolism of a corresponding arteriole. As the limb becomes pale before any decided

appearance of desiccation, it becomes entirely insensible to irritants. Even while some muscular power continues, the points of pins and penknives produce no sensation whatever. As the extremities dry up they become readily separable at the joints, being only attached by a leathery string of dried-up tissue, which the patients themselves twist off or cut with scissors. I have heard of but two cases of recovery from this horrible disease. One man recovered after losing all his fingers and one thumb; the remaining thumb, with its corresponding palm, became quite flexible and useful, and he lived many years in Rio de Janeiro in pretty good health, and he is remembered in this crippled condition by many persons. He attributed his recovery to a diet of yngamè (*Caladium esculentum*) and pork, neither of them much cooked. The other case of recovery was a boy at Campinas who had some difficulty with his family, so that they intended to place him in a house of correction. He lived two or three years concealed in the forest, living on wild fruits and rabbits and such other small animals as he could contrive to catch. These were not always well cooked, for fear his fire might betray his hiding-place; but he eventually returned quite well, except some deficiency of fingers and toes. Does the use of uncooked meat render the blood more alkaline, or from any other cause more fluid? Or does such food promote vasomotor energy?

Cretinism and goitre.—We occasionally see in the newspapers of Rio terrible accounts of cretinism and goitre in some of the interior provinces, but we have no means of judging how much of these stories is made up of sensational exaggeration.

Endemic stricture of the œsophagus.—There is one terrific endemic disease which, so far as known, is entirely confined to some interior provinces of Brazil. Perhaps it is entirely confined to the district of Limeïras, in the province of San Paulo. Its symptoms are pathognomic, and clearly indicate it to be

organic stricture of the œsophagus. I have heard of this disease from various and independent sources, and it is alluded to in Fletcher & Kidder's "Brazil," but my most definite information is derived from conversations with my friend J. Cooper Reinhart, M. D., of Campinas. The doctor had heard frequently in various localities stories of death from *mal de enyasyo* (choking disease) without thinking much about the matter. But on one occasion he was called to prescribe, in the district of Limeïras, for an almost hopeless case of remittent fever; and, on the second or third day, noticing symptoms of amendment, he ventured to speak to the mother of the young man about his improved condition, assuring her of his ultimate recovery. She was not to be consoled in this way, but answered, "O, yes, he may get well of the fever, but he will die of *mal de enyasyo*." This apprehension was fully verified. He convalesced well from the fever, with the exception of some little difficulty in swallowing his food; the difficulty increased, with an accumulation in the lower part of the œsophagus after eating, eventually thrown up by vomiting. The disease was steadily progressive in severity till its fatal termination in about a year, apparently of starvation. This disease the doctor calls "*Dysphagia brasiliensis*." He has seen many cases in various stages of progress, all of which, so far as he has heard, have terminated fatally. In some localities the disease is excessively dreaded, and is a constant subject of conversation; while within ten or fifteen miles, with a small river to obstruct intercourse, the people know nothing of it; even old people thus near have never heard of it.

We are sufficiently familiar with this form of disease, as it is occasionally caused by the accidental swallowing of caustic fluids, such as strong mineral acids or solutions of potassa; but as an endemic peculiar to certain localities, not traceable to any specific cause, I believe this disease to be an entirely new thing to medical science.

Ships on the South Atlantic station spend much time in the river La Plata, particularly in the harbor of Montevideo, Uruguay. Some climates are deemed more favorable than others for human health and longevity, prosperity and progress; and surely the states bordering on the La Plata are favorably situated in this respect. We would not intimate that there is any absence of disease and death, for man's improvidence makes these too common everywhere. The principal loss of life among seamen is by drowning. There is greatly needed a breakwater to render communication between ships and the shore more safe.

MONTEVIDEO.

Cholera.—Montevideo has suffered severely from cholera on one side of the city, the part built on a mud flat by filling it up with street-sweepings.

Yellow fever.—There have likewise been epidemics of yellow fever, not quite so strictly confined to the same part of the city.

Small-pox.—During most of the thirty months which I spent on this station, Montevideo was suffering from small-pox. It seems that vaccination had fallen into disuse here as elsewhere; and many persisted that they would not be vaccinated, and only changed their minds when they had the small-pox in their own families. This rolling country, with its pure, dry atmosphere, is very free from malaria, as witness the big bullocks and the ruddy health of the guachos.

BUENOS AYRES.

Buenos Ayres is similarly well situated in regard to climate; the *good breezes*, dry climate, and permeable soil give it a decidedly healthy character, notwithstanding the general level character of the country.

Yellow fever.—The city of Buenos Ayres suffered terrifically from yellow fever in 1871. This city, as old as the city of

Boston, gets its drinking-water from wells dug deep in the soil; and the cess-pools are dug into the same soil, and have been thus arranged from the beginning, never cleaned out, but covered over when full, till the excrements of six generations are stored in these honey-comb-like cells—except what has filtered into the wells of drinking-water. This disgusting and deadly nuisance is quite unnecessary but for human ignorance and perverseness. The great river La Plata has good enough water, and the site is sufficiently elevated to give perfect drainage by the construction of simple drains and sewers.

PARAGUAY.

Paraguay, nearer the equator, has a warmer and moister climate, hence some suffering from malaria and mosquitoes. The trips of the Wasp to Assumption have generally caused a few cases of intermittent fever.

Sanitary precaution.—Some definite understanding with the authorities of Uruguay is really desirable with reference to any vessel which might arrive from Brazil with yellow fever on board. Simply to quarantine such vessels (as was done with a French sloop of war at Hampton Roads in 1868) is merely to murder the crew and officers outrageously. The quarantine establishment at Flores Island is quite insufficient; and if a vessel should be infected here, (as was the Susquehanna a few years ago in the West Indies,) I should apprehend the very worst consequences. There is an island forming the harbor of Maldonado, about a hundred acres, entirely destitute of inhabitants or even remains of a hut, with good landing, and good water for the labor of digging a well; this island might be used to shelter yellow-fever patients in hospital-tents made of the ship's sails. The next best thing would probably be to go to sea toward Magellan's Straits, perhaps enter a harbor on the east coast of Patagonia, where there are no inhabitants, or, at any rate, none disposed to enforce barbarous quarantine laws.

REPORT OF A VISIT TO HOSPITALS

AT

GIBRALTAR, MALTA, SINGAPORE, HONG-KONG AND SHANGHAI.

By WM. K. VAN REYPEN, M. D.,

SURGEON U. S. NAVY.

U. S. S. IROQUOIS.

SHANGHAI, CHINA, *November* 7, 1872.

SIR: I have the honor to transmit herewith a report of the condition of the principal hospitals in the ports visited by this ship on her passage from New York to join the Asiatic fleet.

My observations have been made principally in relation to hospital construction, and the means adopted for the care and comfort of the sick, with a view of ascertaining whether or not any of them were possessed of advantages which might readily be adapted to the improvement of naval hospitals in the United States.

Having been on duty at different times at four of our naval hospitals, and being somewhat familiar with their management, I can confidently assert that in no foreign hospital that I have visited can the sick be better cared for than in any of the United States naval hospitals.

Isolated items of interest are noted in connection with the various hospitals visited.

Very respectfully, &c.,

W. K. VAN REYPEN,

Surgeon, U. S. N.

To Surgeon-General J. C. PALMER,

U. S. Navy.

GENERAL MILITARY HOSPITAL, GIBRALTAR.

The General Military Hospital of Gibraltar is situated about 510 feet above the level of the sea, with a northwestern exposure. The building is of stone, two stories high, and built in the form of an oblong square, with an unpaved court-yard in the center. The upper story has a veranda running around the entire building overlooking the court-yard. The building is lighted with gas and heated by open grates in the wards. The ventilation is imperfectly regulated by ventilators near the ceiling communicating with open air-shafts; 1,200 cubic feet of air-space is allotted for each patient. The water-closets and bath-rooms are remote from each other and from the wards. The former, especially, are badly ventilated and apparently badly cared for. The kitchen is in a detached building, and the patients' cooked meals have to be carried about 50 feet through the grounds to reach the main building. The hospital has accommodations for 275 patients. The wards are small, the largest containing sixteen beds. The walls are whitewashed, and the floors kept clean by scouring. The bedsteads are iron frames, with sacking bottoms lashed. Each patient, who is not sufficiently ill to occupy his bed during the day, folds his mattress and bedding neatly and deposits it on the foot of his bed. There is no general mess-room, each patient taking his meals from the top of his bedside-locker. There is no pest-house attached to the hospital, one of the remote wards being used for contagious diseases. The hospital has no especial merits.

ROYAL NAVAL HOSPITAL, MALTA.

The Royal Naval Hospital at Malta is situated on a bluff on the opposite side of the bay from the city of Valetta. It consists of an imposing center building, built of stone, two stories high, with a detached building on either side, comprising the wards, nurses' rooms, &c. All the buildings are built of the

soft straw-colored sandstone underlying the soil over the whole island of Malta. The hospital contains 270 beds, some of which are arranged in two long wards, one in either building. The wards are 97 feet long, 24 feet 2 inches in width, and 22 feet high; 1,790 cubic feet of air-space is allotted to each patient, but the height of the ceiling is disproportionate to the width of the room, and the beds are placed too closely together for either comfort or convenience. The bedsteads are of iron, with sacking bottoms lashed. A single hair-mattress is used on each bed. On each occasion that a mattress ceases to be used it is sent to the picking-room, where the hair is repicked, the cover washed, and the mattress remade. This regulation is strictly enforced, even though a patient occupies a bed for only one day. The mattresses consequently are always clean and in perfect order. Each bed is supplied with a feather pillow, two linen sheets, a Marseilles counterpane, and white woolen blankets, as required. A bedside-table is allotted to each bed. The mess-tables are spread in the wards, the hospital having no mess-hall. This arrangement is not in accordance with the judgment of the medical officers, but it is a relic they have not yet been able to remove. The climate in Malta is so mild that fires are seldom required. When necessary, the wards are heated by fires in open grates at either end of the ward. The buildings are lighted by gas. Hot and cold water is supplied to the bath-rooms. The water-closets are admirably arranged, and are near the wards. The bowls are cast-iron hoppers, with wooden circles for seats. There is no frame-work about them, and they are easily kept clean. Water is supplied by a faucet. The floors of the water-closets are tiled with porcelain tiles, and from the facility with which they are cleaned all the closets are models of neatness. Close-stools and bed-pans, of a model less convenient than those used in our own hospitals, are used in the wards. Whenever any medicine or disinfectant of

a poisonous nature is used it is always dispensed in a bottle of colored glass, with the word "Poison" molded in large letters in the glass. I am informed that no cases of accidental poisoning have occurred since this regulation was established. This hospital is one of the largest of the English foreign hospitals, and there are always kept in reserve medicines and medical stores for 5,000 men. Ventilation is accomplished by means of hinged shutters near the ceiling in the wards, but no arrangements are made for the introduction of fresh air below. The building is drained by sewers cut out of the rock leading out to the harbor below low-water mark. The furniture of the hospital is old and dilapidated. Both the patients and attendants are barely supplied with conveniences. Attached to the hospital, and about three hundred yards distant, is a small hospital for contagious diseases. It is both small and inconvenient. The diet-table is almost an exact copy of the one in use in United States naval hospitals. The kitchen is in the basement, and contains only an ordinary range and boiler. The laundry has a small washing-machine and two centrifugal wringers, but they are worked by hand.

The tiled floors for the water-closets and the colored bottles for poisons are worthy of note.

CIVIL HOSPITAL, SINGAPORE.

Singapore, although one of the dependencies of Great Britain, and a military post, has as a garrison only a part of one regiment, and the post-hospital is correspondingly unimportant. The Civil Hospital is situated about a mile from the city, in a grove of trees, where the palm and banyan shield it from the rays of the equatorial sun. The hospital comprises five detached buildings; three are used for wards, one for officers and attendants' quarters, and one for kitchen and laundry. All the buildings are one story high, built of limestone, and whitewashed.

They are protected by tile roofing, and have verandas running entirely around the buildings. The doors and windows are so numerous as simply to allow space for a bed between them. The walls are whitewashed and the floors laid with red tiles made from the clay of the country. Tar and asphaltum are freely used about the base-boards of the walls and the bases of the veranda-columns, and by its constant presence neutralizes the otherwise existing hospital-odor. The hospital contains 48 beds, arranged in rows on either side of the long wards; 1,400 cubic feet of air-space is allotted to each patient. The bedsteads are wooden frames with wooden slats, primitive in construction and badly adapted either for comfort or cleanliness. There is a hair-mattress supplied to each bed, but the extreme heat renders unnecessary bed-linen or blankets. Common wooden close-stools are used in the wards, and comprise almost the whole of the furniture of the desolate-looking apartments. The wards are lighted with gas and ventilated by means of the open doors and windows. The bath-rooms and water-closets are adjacent to the wards. Open drains communicate between the water-closets and the river. The kitchen arrangements are primitive and admit only of the crudest kind of cooking. The diet of the patients consists almost entirely of rice and vegetables. The patients are Malays and Chinese, and their stoical dispositions preclude the necessity for that careful attention to their recurring wants so requisite for the Anglo-Saxon race.

In the hospital inclosure, and under the same supervision, is a building, similar in construction to the hospital-wards, used as a lunatic asylum. It is divided through its length by a dividing wall, and on either side of it are arranged the cells for the inmates, males on one side and females on the other. The cells are entirely destitute of furniture, except a raised platform on one side of the cell and an open bucket for stools. On this wooden platform the demented usually sit from morning until

night, unconscious pedestals of dethroned reason. Those of their number who are disposed to be violent are confined with arm and leg irons. No provision is made for their comfort, and no attention is paid to their prospective recovery. In the institution or its appointments there is nothing to commend.

SEAMAN'S HOSPITAL, HONG-KONG.

The Seaman's Hospital at Hong-Kong is situated at an elevation of about 200 feet above high-water mark, on one of the chain of hills surrounding the harbor. It is built of the soft limestone of the island. The hospital is two stories in height, and consists of four buildings 30 feet square, set on the four angles of a square inclosing a paved court-yard. In the rear center of each of these buildings is an offset from the main building containing a bath-room and water-closet on each floor. A covered veranda runs around the rear of the buildings on each story inclosing the court-yard. On the lower floor of the buildings are the officers' store-rooms, dispensary, officers' quarters, and attendants' rooms. The upper story is devoted to wards. Of these there are four, with sixteen beds in each. The wards are well supplied with doors and windows, by means of which alone ventilation is accomplished. The bedsteads are plain iron frames with sacking bottoms, laced. Very little covering is required, and the only bed-furniture consists of a thin hair-mattress with a grass mat covering it; 1,250 cubic feet of air-space is allotted to each patient. There is a bedside-locker adjoining each bed, from which only those who are unable to leave the ward are allowed to take their meals. The kitchen and laundry are primitive in arrangement and operation. The hospital is clean and well managed.

SHANGHAI GENERAL HOSPITAL, SHANGHAI.

The Shanghai General Hospital is located on the French Bund, about one hundred yards distant from the Woosung

River. The building is about 60 feet square, built of stone, three stories high, with veranda running around each story. It was originally used as a government building, and afterward adapted for its present purpose. On the lower floor are the dormitories for the Sisters, the dispensary, reception-room, and surgeon's office. The two upper stories are set apart for wards and private rooms for officers and first-class patients. A wide hall runs from front to rear, with the wards on either side. The hospital will accommodate 60 patients, with an air-space of 1,200 cubic feet for each. The general wards are four in number, with twelve beds in each. The bedsteads are iron frames, with sacking bottoms, laced. Iron uprights are attached to each bed for netting. On each bed is a hair and straw mattress. The straw-mattresses are frequently renewed, and the hair-mattresses are repicked every four months. Alongside of each bed is a bedside-locker, containing a change of linen. The locker is also used as a table for the patient, whether a convalescent or not, there being no general mess-hall. The building is heated by stoves, and lighted by means of oil-lamps. There is neither hot nor cold water supplied by pipes through the building. Ventilation is accomplished solely by means of the doors and windows. Drainage is effected by means of closed sewers leading to the adjacent river. The building is under the jurisdiction of a committee of citizens of Shanghai, but is practically under the control of the French Sisters of Charity. The bath-rooms are in the rear of the halls. The water-closets are in the rear of the building at the end of each veranda. There is no laundry attached to the hospital, all the washing being done by Chinamen outside. The kitchen is a detached building in the rear of the hospital, and connected with it by a covered passage-way. All the cooking is done on a large and well-constructed range placed in the center of the kitchen. The cooks are Chinamen, but they are superintended

by a Sister of Charity. The hospital has no regular diet-table, but the patients are liberally supplied with the best articles purchasable in the Shanghai market. Pulse and temperature tables are accurately kept in each case of acute disease. Two stewards are employed, one for day and one for night service. A watchman is constantly on duty, but the nursing is allotted exclusively to the Sisters. The cleanliness of the building and the general air of comfort and propriety are the best evidences one could desire of the unremitting care and devotion to duty of these self-sacrificing women.

EPIDEMIC OF YELLOW FEVER

AT

THE NAVY-YARD, PENSACOLA, FLA., DURING THE SUMMER AND FALL OF 1874.

By J. R. TRYON, M. D.,

SURGEON U. S. NAVY.

My orders to navy-yard, Pensacola, Fla., during the latter part of the recent severe epidemic of yellow fever, necessitates an account of the appearance of the disease at that point, its course and termination, and its effect upon officers and men of the Navy attached to the station.

The navy-yard, Pensacola, Fla., is situated in latitude 30° 20′ 35″ north, and longitude 87° 16′ west, and is built on the north side of a bay one and a quarter miles in width, directly opposite Santa Rosa Island, and five and a quarter miles in a southwest by west direction from the city of Pensacola.

Compass-direction from quarantine station to the city of Pensacola, north by west; distance, three and a quarter miles. Compass-direction from navy-yard to quarantine station, east by north; distance, four and a quarter miles.

Adjoining navy-yard on the north is the town of Woolsey; adjoining it on the west is the town of Warrington.

The population of the city of Pensacola is 3,335; 2,085 whites, and 1,250 colored.

The towns of Woolsey and Warrington contain a population of about 2,750 whites and 1,250 colored.

Resident in navy-yard upon appearance of yellow fever, 79;

officers and men of the Navy, 46; members of officers' families and others, 33.

On board the monitors Canonicus, Ajax, Saugus, Mahopac, Manhattan, and tug Rose, stationed in harbor, there were 85 officers and men; total, 164.

The whole section of country is level, and soil sandy.

At Pensacola the sanitary regulations are very defective, and drainage imperfect; the same may be said of the adjoining towns, Warrington and Woolsey.

In the center of the navy-yard are infected hospital-buildings, used during yellow-fever epidemics of 1863 and 1867.

In the rear of commandant's quarters are infected marine-barracks, where the disease existed to an alarming extent during the same epidemics.

Being on duty at this station during the epidemic of 1863, I have recorded in my private note-book 29 cases of yellow fever, and 15 deaths, at marine-barracks, Pensacola navy-yard.

The monthly mean of thermometer and wind-force, from June 1, 1874, to November 1, 1874, is given in the following table:

Month.	Mean of thermometer.	Wind-force.	Rain-fall.
June	79°.0	2.2	No record.
July	81 .6	2.4	Do.
August	88 .5	2.1	Do.
September	88 .9	2.9	Do.
October	86 .4	2.3	Do.

Maximum temperature during the epidemic, 107°; minimum temperature during the epidemic, 67°.

I am sorry the records will not permit me to submit complete meteorological registers.

About the 1st of July, 1874, two brigs, with a virulent form of yellow fever on board, anchored at quarantine-grounds above referred to.

I am told, upon the most reliable authority, that all hands

on board these vessels died of the disease; a lad that escaped from one of them perished with the fever in the neighboring swamps.

While these vessels were in quarantine there was frequent communication with them and the city of Pensacola, and no restrictions existed as to communication between the navy-yard and the city of Pensacola until September 1, 1874, after the appearance of the disease at this point.

No quarantine existed between the shipping and the shore during the epidemic.

I have been unable to learn the precise date of strict land-quarantine established by the city authorities of Mobile and Montgomery against Pensacola; it lasted until November 5, 1874, and there has been no report of the appearance of the disease at those places.

I will not go into the history of yellow fever, or the previous epidemics that have occurred in Pensacola since its first appearance there in 1765. I am a firm believer in its importation, and feel confident that the epidemic under consideration was caused by the disease being brought in the infected ships mentioned, communicated, through slack quarantine regulations, to the neighboring city, towns, and navy-yard, and aggravated in the latter place by the local conditions mentioned, any one of which is sufficient, in this latitude, to intensify epidemic causes.

The first case of yellow fever occurred in the city of Pensacola the beginning of August, 1874, and about thirty days after the arrival of the infected vessels in quarantine.

The disease progressed with fearful rapidity, and every one able to leave the place did so.

I have used every effort to obtain from residents and local practitioners some reliable information relating to the epidemic in that quarter, estimate of the number of cases, &c., but have

been unsuccessful. The number of deaths from the disease, obtained from the city sexton, is given to me as 118.

On August 17, 1874, Capt. Jas. F. Baker, U. S. Marine Corps, who had just returned from a short visit to Pensacola, was attacked with fever, and noted in medical journal under date of August 27, 1874, as being of a "pernicious remittent type." Recovered.

The subsequent history of cases attacked, together with Captain Baker's symptoms, noted in journal, and sequelæ of the disease, leaves no doubt in my mind of its being the *first case* of genuine yellow fever.

Seven days intervened between this and the next undoubted case.

AUGUST 25, 1874.

Second case.—A marine who had been nursing Captain Baker during his illness. Death by black vomit on the 27th.

Nine days occurred between this and the next undoubted case, when the disease spread rapidly, and continued until November 9, 1874, when the last case occurred.

SEPTEMBER 4, 1874.

Third case.—A marine, who had been nursing Captain Baker during his illness. Recovered.

SEPTEMBER 5, 1874.

Fourth case.—A marine. Death on the 6th.

SEPTEMBER 6, 1874.

Fifth case.—A marine. Recovered.

SEPTEMBER 7, 1874.

Sixth case.—Surgeon J. B. Ackley. Death on the 11th.

On the above date the first case that appeared in the shipping reported.

Seventh case.—Ward-room cook of the Ajax. Recovered.

SEPTEMBER 8, 1874.

Eighth and *ninth cases.*—Apothecary and a marine; both recovered.

SEPTEMBER 9, 1874.

Tenth and *eleventh cases.*—Marines; one died on the 11th, other recovered.

SEPTEMBER 13, 1874.

Twelfth case.—Commander Chas. L. Franklin. Death on the 18th.

SEPTEMBER 14, 1874.

Thirteenth case.—Acting Passed Assistant Surgeon Geo. B. Todd. Death by black vomit on the 20th.

Fourteenth and *fifteenth cases.*—A landsman from the tug Rose, and a marine; both had black vomit, but recovered.

SEPTEMBER 18, 1874.

Sixteenth case.—Capt. A. A. Semmes. Recovered.

SEPTEMBER 19, 1874.

Seventeenth case.—A marine; patient had black vomit, but recovered.

SEPTEMBER 20, 1874.

To the above date, only two cases had reported from the shipping; a period of thirty-four days from this time, however, the disease increased there and prevailed until end of epidemic.

Eighteenth and *nineteenth cases.*—A seaman from the tug Rose, and a cabin steward attached to monitor Manhattan, but living in quarters on shore; both recovered.

SEPTEMBER 21, 1874.

Twentieth case.—A marine. Death on the 23d.

SEPTEMBER 22, 1874.

Twenty-first case.—A landsman from monitor Ajax. Death on the 28th.

Twenty-second case.—Assistant Engineer N. H. Lamdin, attached to monitor Manhattan, but living in quarters on shore. Recovered.

SEPTEMBER 23, 1874.

Twenty-third case.—A marine. Recovered.

SEPTEMBER 24, 1874.

Twenty-fourth case.—Second Lieut. William B. Slack, U. S. Marine Corps. Death on the 27th.

Twenty-fifth case.—A marine. Recovered.

SEPTEMBER 26, 1874.

Twenty sixth case.—A marine. Death on the 28th.

SEPTEMBER 27, 1874.

Twenty-seventh case.—Acting Assistant Surgeon J. E. Miller, from monitor Saugus. Recovered.

SEPTEMBER 28, 1874.

Twenty-eighth case.—Commodore M. B. Woolsey. Death October 2, 1874.

Twenty-ninth case.—Lieut. Commander E. N. Kellogg, from monitor Ajax. Death October 6, 1874.

Thirtieth case.—Assistant Engineer E. F. McElwell, from same vessel. Recovered.

SEPTEMBER 30, 1874.

Thirty-first case.—Lieut. Commander C. J. Barclay, from monitor Saugus. Recovered.

OCTOBER 1, 1874.

Thirty-second case.—An ordinary seaman attached to tug Rose, confined in navy-yard jail at time of attack. Recovered.

OCTOBER 2, 1874.

Thirty-third case.—Passed Assistant Paymaster John Macmahon, from monitor Ajax. Recovered.

Thirty-fourth case.—A first-class fireman from monitor Saugus. Death October 4, 1874.

Thirty-fifth case.—A machinist from monitor Ajax. Death October 5, 1874.

OCTOBER 3, 1874.

Thirty-sixth case.—A first-class fireman from monitor Saugus. Death October 5, 1874.

No cases for four days.

OCTOBER 8, 1874.

Thirty-seventh case.—A marine. Death October 11, 1874.

OCTOBER 9, 1874.

Thirty-eighth case.—A seaman from monitor Saugus. Recovered.

No cases for seven days.

OCTOBER 17, 1874.

Thirty-ninth case.—A machinist from tug Rose. Recovered.

OCTOBER 18, 1874.

Fortieth case.—A seaman from monitor Ajax. Recovered.

Forty-first case.—A first-class fireman from same vessel. Death by black vomit in ten hours.

No cases for four days.

OCTOBER 23, 1874.

Forty-second case.—A seaman from monitor Saugus. Recovered.

No cases for five days.

OCTOBER 29, 1874.

Forty-third case.—A paymaster's yeoman from monitor Ajax. Recovered.

No cases for ten days.

NOVEMBER 9, 1874.

Forty-fourth and *last case.*—A marine. Recovered.

A list prepared from the above *résumé* of cases, arranged according to date of attack, giving name, grade, age, and result, is appended, marked "A."

It will be seen by the following table that forty-four officers and men of the Navy were attacked with the disease and seventeen died; mortality, 38.65 per cent.:

Officers attacked	13
Died	6
Sent to duty	2
Condemned by medical survey	5
Men attacked	31
Died	11
Sent to duty	18
Discharged on pension survey	2

The following shows the nativity of those attacked:

United States	26
Great Britain	9
Germany	7
Denmark	1
France	1
Total	44

In the above number only those belonging to the Navy are included. Twenty additional cases of the disease and five deaths occurred among those belonging to officers' families and others residing in the yard, making the following totals:

Number of cases of yellow fever in navy-yard during epidemic	64
Number of deaths	22

Mortality, 34.37 per cent.

By referring to the number heretofore stated as living in navy-yard and on board the shipping in harbor, it will be seen there were 164 persons present at the commencement of the epidemic.

September 1, 1874, 16 marines were sent to guard the bayou, distance three miles from navy-yard.

September 9, 1874, Captain Semmes' family, numbering 5 persons, left for Perdido, distance about ten miles.

October 2, 1874, the monitor Canonicus left for New Orleans with 50 officers and men.

On the same day 2 officers started for Perdido "on leave."

Total number leaving, 74.

Hence 91 individuals were exposed to the continuous epidemic influences of the disease, and of this number 64 were attacked with the fever. Of the fortunate 27 who escaped, all except 3 had suffered from the disease during some previous epidemic.

	Per cent.
Attacked	70.32
Escaped	29.67
Unprotected, exposed entire epidemic and not attacked	3.29

Of the whole number of cases, only four were of negro blood; two recovered and two died. No reliable information can be obtained as to the number of cases in the towns of Warrington and Woolsey. Number of deaths, 27.

I can safely state that the departure of the monitor Canonicus, by order of the Department, on October 2d, 1874, with her crew of fifty men, accounts for the diminution of cases from that date and the interval of four and sometimes seven days between subsequent cases; in fact, arrested the epidemic for want of material.

No cases of fever had occurred on board the Canonicus to date of sailing, and her complement was made up from non-infected ships. She proceeded to quarantine-grounds below the city of New Orleans, and escaped without a case of the disease appearing on board, although stationed in an infected port over thirty days; showing, if proper action be taken even late in an epidemic, vessels can be kept healthy and the lives of officers and men saved.

There was frost on the 2d and 3d of November.

On November 13, the yellow-fever ward in hospital was abandoned, infected clothing and bedding destroyed, and convalescent patients removed into a part of the building cleaned and prepared for the purpose.

By the 14th instant, all infected hospital-property and infected personal effects of officers and others had been surveyed and destroyed. Every building in the yard where the disease had existed—hospital, marine-barracks, guard-house, officers' quarters, &c.—had been cleaned and disinfected, and I was able to report, in obedience to the accompanying appended order, marked "B," that I considered the epidemic over, and that it would be safe for officers absent and others ordered to report for duty on the station at any time after the 25th of November, 1874.

The illness and death of Surgeon J. B. Ackley, at the commencement of the epidemic, is much to be regretted; for I believe that upon a proper representation of the facts at that time, and recommendations as to the course to be pursued, if approved,

would have been carried out and many of the dire results prevented.

Acting Passed Assistant Surgeon George B. Todd, whose illness and death soon followed, labored night and day in care of the sick as long as strength lasted, and without medical assistance.

Upon Dr. Todd's illness, there being no naval medical men on the station, civilian physicians were employed.

The services of Dr. J. S. Herron, of Pensacola, Fla., were obtained from September 11 to 13.

The services of Dr. W. A. W. Spotswood, of Molino, Fla., continued from September 13 to 21.

On the morning of September 17 Acting Assistant Surgeons J. W. Dillman and J. E. Miller reported for duty, and were ordered to the iron-clad fleet.

Dr. Miller was soon taken down with the fever; after his recovery was ordered to the hospital, but, being unfit for duty, was condemned by medical survey, and sent north on the 10th instant.

Dr. Dillman's services were confined to the Canonicus, and accompanied that vessel to New Orleans, October 2, 1874.

On the evening of September 17 Acting Assistant Surgeon William Martin, from naval rendezvous, New Orleans, reported for temporary duty. Dr. Samuel Logan, professor of anatomy at the University of Louisiana, arrived at the same time.

But for the combined labors of the gentlemen mentioned both officers and men would have suffered much more severely during the epidemic; they were unremitting in their attention to the sick, and have the thanks of every officer and man on the station. Dr. Logan remained until October 10.

Dr. Martin was the only naval medical officer on continuous duty in the epidemic until my arrival, and merits well the favorable consideration of the Department.

Dr. A. J. Semmes, from Savannah, Ga., arrived September 21, but remained only a few days.

The epidemic was most virulent in form and fatal in results, resembling in character that of 1863 at this point, and, from what I have read, not unlike the epidemics at Shreveport and Memphis last year.

In cases attended with black vomit, death usually followed within eighteen hours, and only three persons recovered after this grave symptom. All ages were susceptible to the disease; children had light attacks, and recovered in every instance.

That an attack of yellow fever, in some previous epidemic, acts as a preventive of the disease may be stated as a fact, so far as the recent epidemic is concerned.

I have made most thorough inquiries regarding this, and have neither seen a case nor heard of a person taking the disease a second time, when positively known that the first attack was undoubted yellow fever.

The period of incubation of the disease is uncertain, and necessarily varies in different individuals; with those present on the station before and after the outbreak of the epidemic, and continuously exposed to its causes, no specified time can be stated. But with those arriving from the North during the epidemic, unprotected and unacclimated, the attack is almost certain to take place within fifteen days after exposure.

I cite a few authenticated cases:

Dr. Gale, formerly of the Navy, ordered to this station during the epidemic of 1867, took the disease within ten days after arrival. Recovered.

Dr. Campbell, formerly of the Navy, ordered during same epidemic, was attacked within fifteen days after arrival. Recovered.

J. D. Murphy, late passed assistant surgeon United States Navy, ordered during same epidemic, took the disease within

fifteen days after arrival, October 21, 1867, and died in four days.

Acting Assistant Surgeon J. E. Miller, ordered during recent epidemic, was attacked on the tenth day after arrival.

I know of no reliable protective course to be pursued by individuals during epidemics of yellow fever to prevent infection. To maintain a healthy condition of the system appears to be the only safeguard, and to do that, in the midst of all the depressing surroundings, seems impossible.

Acting Assistant Surgeon Warren, of the Army, in his report of the epidemic of yellow fever at Brenham, Tex., in 1867, mentions "white-mustard seed" as a prophylactic, and states that he administered a tablespoonful of the remedy with an ounce of whisky every morning at 11 o'clock to all in the command, numbering sixty men, thereby preventing the appearance of the disease in camp, located one-fourth of a mile from the town, where the fever broke out August 8, 1867, became epidemic, and continued with fearful ravages. No mention is made of a quarantine existing between the town and camp. On the contrary, "men were exposed in every way as much as any of the inhabitants."

The following facts may be gleaned from what has been written:

1. That the disease was imported.

2. That it made its appearance at Pensacola and at the navy-yard by slack quarantine-regulations.

3. That it spread rapidly by non-isolation of the first cases and by the intensifying epidemic causes on the station.

4. That both percentage of attack and percentage of death were unusually large.

5. That the percentage of escape was exceedingly small, and that the chances of persons unprotected taking the fever were sufficiently great to make exemption from the disease almost absolutely impossible.

6. That all ages were susceptible to the fever.

7. That the period of incubation of the disease is uncertain in the majority of cases.

8. That there was no remedy used that acted as a prophylactic against the disease.

9. That all individuals attacked with yellow fever in some previous epidemic escaped infection.

The disease has a definite course to run; commences with a chill, and is followed by the usual paroxysm of fever, lasting from forty-eight to seventy-two hours; there is severe headache, accompanied with intolerable pain in nape of neck, back, and limbs; the tongue is furred, but moist; eyes suffused and injected; pulse from one hundred to one hundred and twenty-five per minute; temperature, ranging from 101° to 105°; and, in a majority of cases, irritability of the stomach from the first.

The patient is generally nervous and restless, and constantly, I may say, under the influence of a mild mania, readily discernible by those familiar with the disease. I know of no fever more insidious in its nature, nor one that requires more tender nursing and such constant watchfulness on the part of the medical attendant.

Throughout the disease it should be the endeavor of the physician to control, if possible, the mind of the patient, by giving every encouragement; alarming conditions follow the slightest mental depression, offering no hope of successful termination. As little medication as possible seems to me preferable. Perfect rest to mind and body should be enjoined.

In the first stage, a hot mustard foot-bath and dose of castor-oil, citrate of magnesia, or Seidlitz powder. Perspiration should be encouraged by keeping the patient well covered, but not too warmly; warm drinks, a little ice-water at a time, or small pieces of ice, if acceptable to the patient, can be given without danger.

The room should be well ventilated, and kept, if possible, at a uniform temperature; without this precaution a sudden change of weather, likely to occur at any time during an epidemic, will prove disastrous to the patient.

Closing up doors and windows, and smothering the sufferer with blankets until nearly "boiled," I consider does more harm than good.

No solid food should be given; strength must be sustained throughout by broths and the mildest diet. If stomach is irritable, to impart nourishment, administer broths by enema.

Violent symptoms of course must be met and combated by such medicines as in the judgment and experience of the physician the case demands.

The constant attendance of an intelligent nurse is indispensable in treating successfully a yellow-fever patient.

Nothing has been spared by the Medical Department for the comfort of the sick. Both officers and men were provided for as well as the hospital accommodations would permit.

The services of professional nurses were obtained early in the epidemic, either from the neighboring towns or New Orleans, and dispensed with, from time to time, as circumstances would allow. All "extra help" employed at the hospital was discharged on or before November 31, 1874.

Now that the severe lesson taught by the recent epidemic is before us, it may not be out of place to mention in this connection some consistent measures that may be taken to prevent the outbreak and spread of disease on the station during the summer of 1875.

The sanitary regulations of the navy-yard proper are perfect; the drainage is good; supply of water ample and pure. The avenues and grounds, public buildings belonging to the yard, and officers' quarters, are kept in the best condition; and I can

see no cause for disease, if the following recommendations, reasonably explained, be favorably considered.

First. The removal from the harbor, on or before the 1st of June, 1875, the infected monitors Ajax and Saugus and tug Rose. The monitor Saugus became first infected at Key West during the summer of 1873.

It is known that the effective cause of yellow fever is completely destroyed by a freezing temperature; hence all infected ships should be subjected to such a temperature for purification until some other mode is known and sufficiently tried to guarantee a like success.

Second. The removal from the yard, before March 15, 1875, of the infected hospital-buildings.

Assistant Surgeon George M. Sternberg, U. S. A., in his valuable report on yellow fever, states "that the presence of decaying timbers, such as are found about all old frame houses, ships, and wharves, is favorable, in some manner, to the preservation and increase of the germ of the disease."

The buildings under consideration were erected temporarily, of poor material, over ten years ago, and are now so rotten as to be unsafe.

Third. The abandonment of the stables, as marine barracks, by June 1, 1875, and removal of the men to some point outside the navy-yard.

The building referred to has been occupied for eleven years by an average guard of fifty men, and allows, by accurate measurement, less than five hundred cubic feet of air per man.

By placing the marines at the time specified in a camp, properly located, would not only be beneficial to *them*, but would *vastly* improve the sanitary condition of the yard.

Fourth. To fumigate early in the summer all buildings that have become infected during the epidemic, and to use disinfectants freely about the premises.

Sporadic cases of yellow fever may occur during the summer following a severe epidemic; and although the type is not severe, and the disease seldom spreads, it is prudent to use every precaution.

To prevent the re-appearance and prevalence of an epidemic of yellow fever, a strict quarantine should be established as early as June 1 of each year, to continue until frost, and rendered effective by being placed under the control of either the Army or Navy authorities on the station.

The accompanying diagram, marked "C," will give an idea of the topography of the navy-yard and vicinity, compass-direction of Pensacola and quarantine station, and locality of officers' quarters, &c.; the Nos. 1 to 44 the number of cases, the locality where and the order in which they occurred.

Index, marked "D," is appended.

All quarters not infected were either uninhabited or occupied by persons having the fever in some previous epidemic.

The monitor Canonicus not infected by leaving the harbor, and monitors Mahopac and Manhattan uninfected by their crews being transferred to Canonicus.

It will be observed that the marine barracks furnished the first cases, and that the medical officers and apothecary, living in hospital-buildings, were attacked at the commencement of the epidemic.

After eight cases had occurred in barracks the men were removed into another building in the yard, and not returned to original quarters until after frost, November 7, 1874.

The building in the mean time was thoroughly cleaned, fumigated, and disinfected, but in spite of it all the forty-fourth and last case broke out there two days after it was re-occupied, (November 9, 1874.)

Infected points.	No. of cases.	Number of case in epidemic.
Marine-officers' quarters	2	1 and 24.
Marine barracks	9	2, 3, 4, 5, 8, 10, 11, 14, and 44.
Naval hospital	3	6, 9, 13.
Ordnance officers' quarters	1	12.
Executive officer's quarters	1	16.
Commodore's quarters	1	28.
Quarters K	2	19, 22.
Temporary marine barracks	6	17, 20, 23, 25, 26, 37.
Guard-house	1	32.
Monitor Ajax	9	7, 21, 29, 30, 33, 35, 40, 41, 43.
Monitor Saugus	6	27, 31, 34, 36, 38, 42.
Tug Rose	3	15, 18, 39.
Total	44	

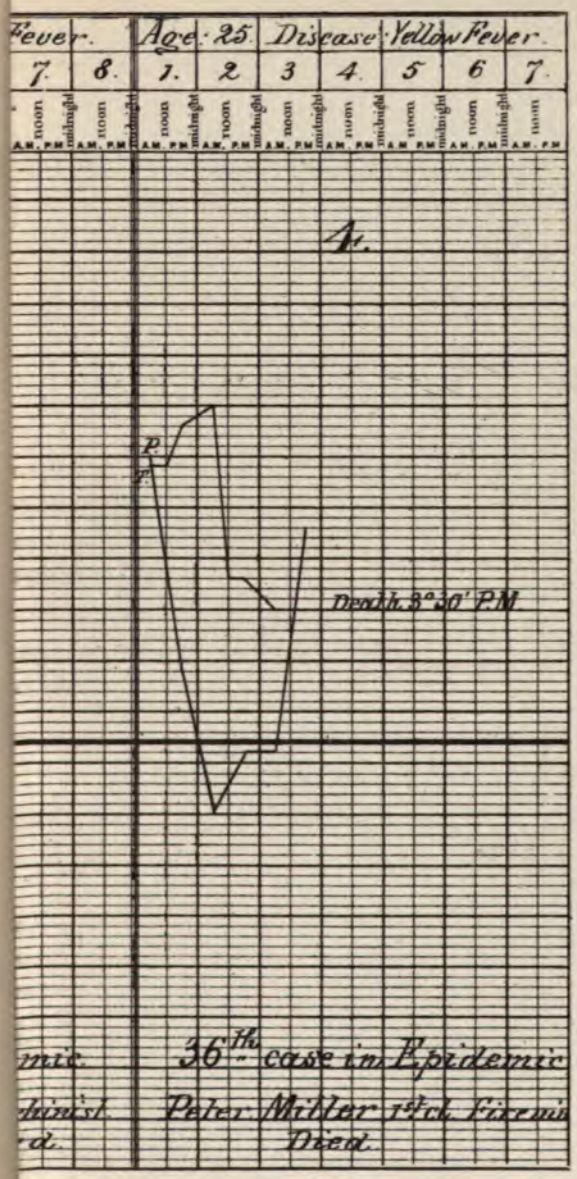
I have also prepared, for your inspection accurate temperature charts (marked "E," "F," "G," and "H" appended) of sixteen characteristic cases of yellow fever, giving name and age of patient, with temperature and pulse from date of attack to death or convalescence.

Since arrival, all labor required to enable me to carry out your wishes has been greatly facilitated by the kind assistance of Capt. A. A. Semmes, U. S. Navy, commanding station.

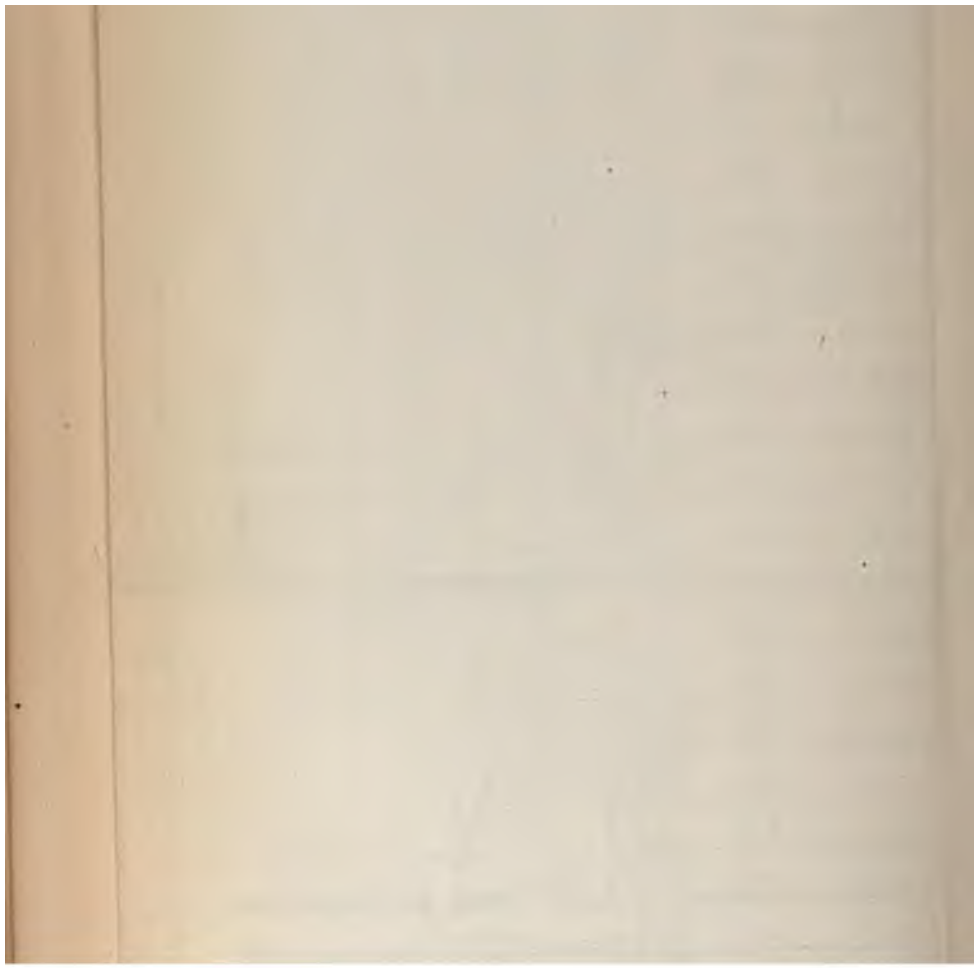
A.

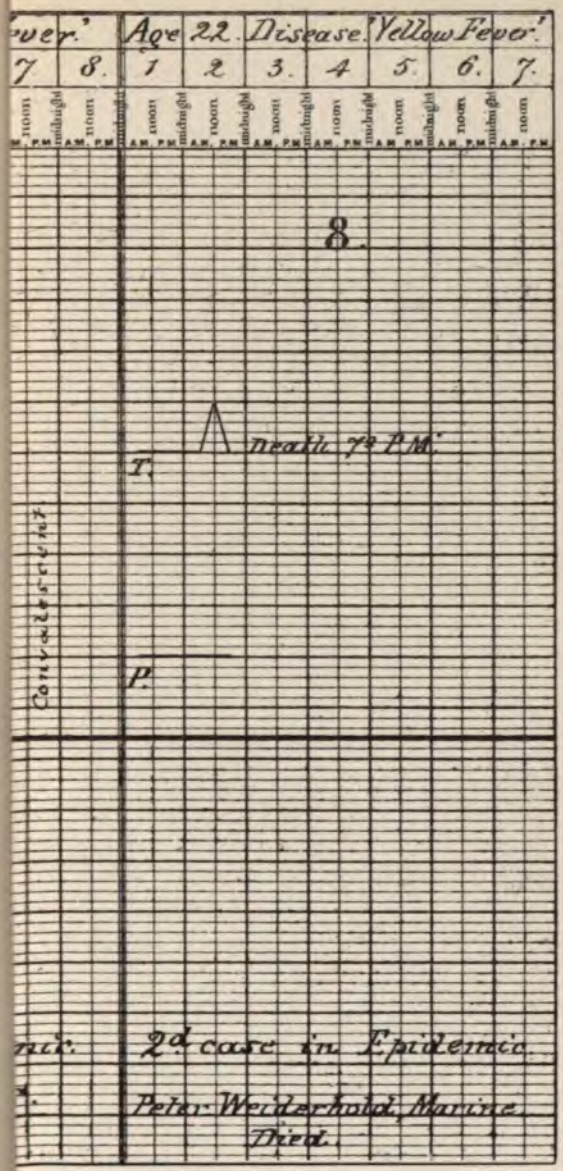
Yellow-fever cases during epidemic of 1874 *at U. S. navy-yard, Pensacola, Fla.*

Name.	Grade.	Age.	When attacked.	Result.
Joseph F. Baker	Captain U. S. M. C	33	August 17	Recovered.
Peter Weiderhold	Marine	22	August 25	Died.
Louis Kitzenstein	Marine	34	September 4	Recovered.
John J. Hellerung	Marine	26	September 5	Died.
Alfred Cooper	Marine	22	September 6	Recovered.
John B. Ackley	Surgeon	39	September 7	Died.
John Thomas	Wardroom-cook	36	September 7	Recovered.
Michael Dowling	Corporal marines	28	September 8	Recovered.
Walter J. Smith	Apothecary	18	September 8	Recovered.
Charles E. Peret	Marine	23	September 9	Died.
Patrick M. Brown	Marine	26	September 9	Recovered.
Charles L. Franklin	Commander	38	September 13	Died.
George B. Todd	Act. Pd. Asst. Surgeon	36	September 14	Died.
Louis Seitz	Corporal marines	22	September 14	Recovered.
Louis Dubois	Landsman	26	September 14	Recovered.
A. A. Semmes	Captain	50	September 18	Recovered.
William Fluke	Sergt. marines	25	September 19	Recovered.
Carl Wilson	Seaman	20	September 20	Recovered.
Philip Kellar	Cabin-steward	23	September 20	Recovered.


Fever.
Age. 25.
Disease. Yellow Fever.
7.
8.
1.
2
3
4.
5
6
7.
noon
midnight
A.M. P.M
A.
P.
Death 3°30' P.M
mic.
dminst.
d.
36th case in Epidemic
Peter. Miller 1st Ch. Firemn
Died.

E.




'ever.'
Age 22. Disease. 'Yellow Fever.'
7 8. 1 2 3. 4 5. 6. 7.
midnight noon midnight noon midnight
A.M. P.M.
8.
Death 7h P.M.
T.
P.
Convalescent
2d case in Epidemic.
Peter Weiderhold, Marine.
Died.

H.

Infected points.	No. of cases.	Number of case in epidemic.
Marine-officers' quarters	2	1 and 24.
Marine barracks	9	2, 3, 4, 5, 8, 10, 11, 14, and 44.
Naval hospital	3	6, 9, 13.
Ordnance officers' quarters	1	12.
Executive officer's quarters	1	16.
Commodore's quarters	1	28.
Quarters K	2	19, 22.
Temporary marine barracks	6	17, 20, 23, 25, 26, 37.
Guard-house	1	32.
Monitor Ajax	9	7, 21, 29, 30, 33, 35, 40, 41, 43.
Monitor Saugus	6	27, 31, 34, 36, 38, 42.
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Total	44	

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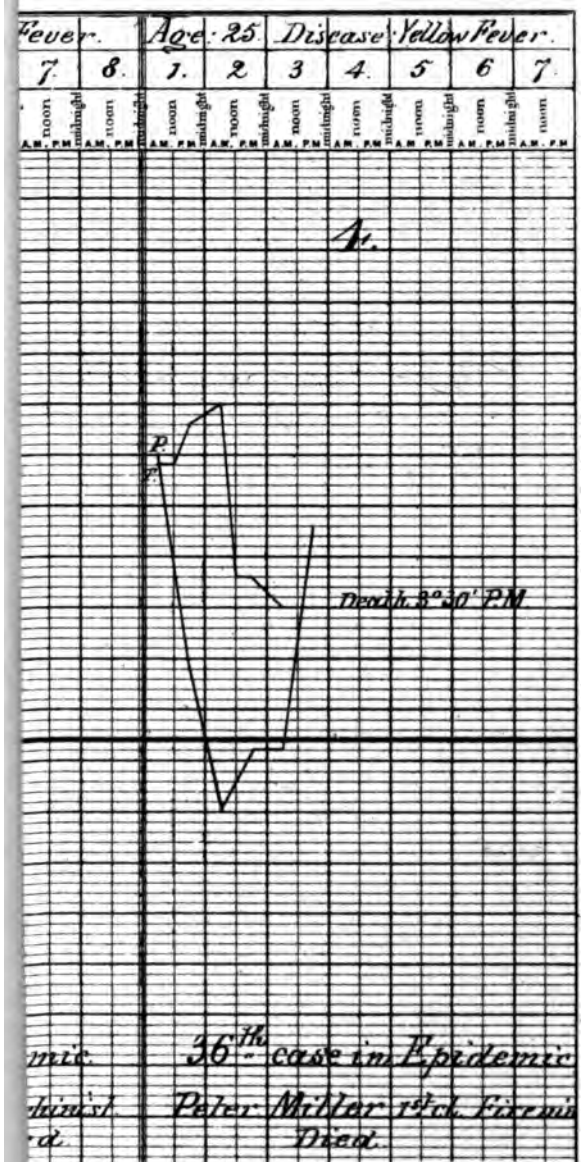
William Fluke	Sergt. marines	25	September 19	Recovered.
Carl Wilson	Seaman	29	September 20	Recovered.
Philip Kellar	Cabin-steward	23	September 20	Recovered.


Fever.
Age. 25.
Disease. Yellow Fever.
7.
8.
1.
2
3
4.
5
6
7.
noon
midnight
A.M. P.M
At.
P.
Death 3h 30' P.M
mic.
36th case in Epidemic
Peter Miller 1st Cl. Fireman
Died.

E.

Yellow-fever cases during epidemic of 1874, *&c.*—Continued.

Name.	Grade.	Age.	When attacked.	Result.
Frederick Mueller	Marine	34	September 21	Died.
Alexander Jones	Landsman	19	September 22	Died.
N. H. Lamdin	Asst. engineer	32	September 23	Recovered.
Thomas R. Keys	Marine	29	September 23	Recovered.
William B. Slack	2d lt. U. S. M. C.	26	September 24	Died.
W. C. McCloskey	Sergt. U. S. M. C	30	September 24	Recovered.
Wallace Jamison	Marine	24	September 26	Died.
J. E. Miller	Act. asst. surgeon	26	September 27	Recovered.
M. B. Woolsey	Commodore	55	September 28	Died.
E. N. Kellogg	Lieutenant-commander	31	September 28	Died.
E. F. McElwell	Asst. engineer	29	September 28	Recovered.
C. J. Barclay	Lieutenant-commander	31	September 30	Recovered.
Frederick Robertson	Ordinary seaman	20	October 1	Recovered.
John Macmahon	Pd. asst. paymaster	31	October 2	Recovered.
Alexander Coull	First-class fireman	33	October 2	Died.
William J. Moore	Machinist	36	October 2	Died.
Peter Miller	First-class fireman	25	October 3	Died.
Robert McGowan	Marine	31	October 8	Died.
George A. Anderson	Seaman	49	October 9	Recovered.
William Criglar	Machinist	21	October 17	Recovered.
James Berryman	Seaman	48	October 18	Recovered.
John O'Doud	First-class fireman	35	October 18	Died.
James Crawford	Seaman	49	October 23	Recovered.
W. W. Rohrman	Paymaster's yeoman	22	October 29	Recovered.
A. J. Wallace	Marine	22	November 9	Recovered.

Month.	Number.	Recovered.	Died.
August	2	1	1
September	29	18	11
October	12	7	5
November	1	1	.....
Total	44	27	17

B.

UNITED STATES NAVY-YARD, PENSACOLA, FLA.,
Commandant's Office, November 12, 1874.

SIR: You will please inform me (at the proper time) when, in your judgment, it will be prudent for officers now absent, and others that may be ordered, to report for duty at this station.

Very respectfully, &c.,

A. A. SEMMES,
Captain Commanding.

Surgeon J. R. TRYON, U. S. N.,
Navy-Yard Pensacola.

D.

A, commandant's quarters.

B, executive officers' quarters.

C, constructor's quarters, unoccupied during epidemic.

D, chief engineer's quarters, unoccupied during epidemic.

E, used temporarily as hospital for officers with yellow fever.

F, ruins.

G, civil engineer's quarters.

H, surgeon's quarters, unfinished at commencement of epidemic.

I, paymaster's quarters.

K, assistant engineer and cook from monitor Manhattan.

L, ruins.

M, gunners' quarters.

N, ordnance officers' quarters.

O, marine officers' quarters, outside of navy-yard.

P, gardener's quarters.

1, stables used as marine barracks until September 18, when vacated, and re occupied November 7, 1874.

2, wooden hospital-buildings.

3, temporary marine barracks where men were removed during epidemic; occupied from September 18 to November 7, 1874.

4, guard-house.

1, 2, &c., number of case in epidemic. Color yellow, infected points in yard.

YELLOW FEVER ON BOARD THE U. S. S. TICONDEROGA,

AT

KEY WEST, FLA., AUGUST, 1874.

By THOMAS N. PENROSE, M. D.,
SURGEON U. S. NAVY.

In accordance with directions, I have to submit the following report on the yellow fever as it occurred on board of the Ticonderoga:

The Ticonderoga was first placed in commission at Boston, Mass., about January, 1871, and was shortly afterward sent to the South Atlantic station, where she remained for a full cruise of three years.

During that time yellow fever prevailed at several ports on that station, and, in the summer of 1873, appeared as an epidemic of great virulence in Montevideo.

I have made many inquiries as to the health of the ship at that time, and am assured that the health of those on board was excellent, and that at no time did they ever have a single case of yellow fever on board, although that disease was prevailing along the whole coast of South America, the cruising-ground of the vessel.

In January, 1874, the Ticonderoga, while at St. Thomas, on the way home, was intercepted by orders from the Department to proceed to Key West, Fla., where a new crew and a complete list of officers were waiting as the relief of those on board.

The ship, after participating in the naval review, which took place at Key West in February of this year, was sent to Nor-

folk, Va., for some repairs, after receiving which the vessel returned to Key West, arriving there June 6, 1874.

The weather at Key West during the months of June, July, and August was exceedingly hot; the average temperature, as obtained from a daily record kept, was 84° Fahrenheit.

Fortunately, a steady breeze from the eastward prevailed a greater part of the months of June and July, and when, toward the close of the latter month calms, or only light winds, prevailed, all on board suffered from the heat. Many also suffered from an aggravated form of lichen tropicus. Boils were quite common among the crew. The average sick-list at this time was about eleven, and the sickness was principally from this cause.

On the 8th of August, the first case of yellow fever occurred on board of the Ticonderoga. Mr. Nathanial A. White, captain's clerk, was attacked on that day. His seizure was rather sudden, as he afterward informed me that he arose that morning in his usual health, but after partaking of breakfast felt badly, and retired to his room, thinking a little rest would relieve him of the severe headache from which he was suffering.

In the evening of the same day I was informed he was not well. On visiting him I found he had a high fever, and the headache from which he had been suffering all day, he stated, had increased somewhat in severity, and, although there was nothing at this time which was particularly characteristic of yellow fever, (the onset of the disease closely resembling other febrile diseases,) yet, taking into consideration the locality of the ship, being only about eighty miles from Havana, where I had been informed yellow fever was prevailing, and from which port vessels were occasionally arriving at Key West, and also from the violence of the fever from which Mr. White was then suffering, induced me to regard the case with suspicion.

I directed that he should take an ounce and a half of castor-

oil immediately, have cold cloths applied to head, and to have a fever-mixture, containing sweet spirits of nitre, given him every hour.

As I have the notes at hand, I beg herewith to give an extract from the medical journal in his case:

August 9, 1874.—Nathaniel Anderson White, aged 22, native of Portsmouth, Va., captain's clerk of this vessel, was admitted to sick-list last evening, complaining of headache. He was attacked yesterday morning very suddenly, and states that he arose at his usual hour feeling very well, but after breakfast felt badly; had a severe headache and some fever, but did not attach much importance to it, yet still felt unable to be about. Last evening he sent for me, and when I visited him he had quite a high fever. Had his bowels freely moved by ol. ricini, ℥iss, and he is to take spts. mindereri, ℥ss, every hour.

August 10.—Passed a very restless night; has less headache, and does not complain of any pain in back and limbs; fever is very high; I judge his temperature to be about 104° Fahrenheit. Give him a hot-mustard foot-bath, and cover him well in bed. Continue spts. mindereri, and let him have a diet of gruel and milk. The ol. ricini given yesterday moved bowels freely.

August 11.—Is worse. Fever still persistent; says he has a very bad headache, and has severe pains in back and limbs. Conjunctiva deeply injected; does not as yet complain of any pain in epigastrium. Apply cold cloths to head, and give him some milk and a little weak tapioca-gruel. Continue fever-mixture. 3 p. m.—Not any better; fever continues; mind is a little dull, but he answers correctly when spoken to; has pain in epigastrium on pressure. 6 p. m.—Is very much disturbed with nausea, but as yet has not vomited anything but water and contents of stomach. Apply sinapism to epigastrium. Pulse is feeble, and the fever greatly diminished. The whole surface of his body is very yellow; respiration is slow, accom-

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panied with deep sighs. Secretion of urine suppressed. Ordered freely of iced champagne, and to chew and swallow small pieces of ice. His bowels were again moved yesterday. Omit fever-mixture.

August 12.—Worse. He began vomiting a dark fluid this morning; is very restless, and pulse is very feeble. Continue iced champagne, and apply counter-irritants to epigastrium. R. Calomel., gr. ss; plumbi acet., gr. j, every hour. 12 m.—Is rapidly sinking; black vomit ejected in great quantities; is delirious; has had a decided convulsion, which lasted a few minutes only. 7 p. m.—Is sinking rapidly, and does not notice anything, nor does he answer when spoken to. 9 p. m.—Died a few minutes ago of yellow fever. 10 p. m.—Body changing rapidly; spots appearing over whole surface.

Mr. White was buried on the 13th of August, and on that day the Ticonderoga was placed in quarantine. No communication whatever was allowed with the shore or with any vessel, except by means of the quarantine boat. All supplies were brought from the shore by this means, and were received by boats from the Ticonderoga, sent to a point agreed upon, which was the buoy known as the quarantine buoy. The ship was moved about two miles from the old anchorage, and to a point outside of Fort Taylor.

After being in quarantine for ten days, and no other cases occurring, the health-officer of the port released the ship from quarantine.

On the 26th of August, and just three days after being released from quarantine, three cases of yellow fever occurred, and another case occurred the following morning. All four of these cases were removed to the Marine Hospital on the 27th, and the ship sailed early on the morning of the 28th for Portsmouth, N. H.

On the 28th of August, while at sea, another case occurred,

and between this date and September 1 three other cases presented themselves, all of which recovered, although their convalescence was slow, and in the case of Herman Spangler, marine, was particularly so. He suffered from boils, and from a functional disease of the heart, which, however, gradually disappeared as he regained his strength.

Of the nine cases of yellow fever which occurred on the Ticonderoga, their nativity was as follows:

	Number.	Died.	Recovered.
United States	4	1	3
Spain	1	1	.....
Ireland	1	1	.....
Germany	3	.....	3

The history of the disease was very much the same as has been described in other epidemics.

The conjunctiva was in nearly every case deeply injected during the febrile stage, and later in the attack became tinged with yellow.

The yellowness of conjunctivæ and of the surface of the body usually did not make its appearance until after the abatement of the symptoms.

Suppression of urine occurred in several cases, and uremic poisoning was in two instances the immediate cause of death.

Delirium occurred in several cases, but was not violent.

Treatment.—As the patients were generally first seen after the hot stage had set in, the following was my usual mode of procedure: The patient was stripped of his clothing and well covered with blankets, leaving the head only exposed, and while seated on a low chair with feet immersed in water as hot as could be borne, his body was sponged with warm water under the blankets; basins of hot water were also placed under the chair, and this method of producing diaphoresis was continued, until other and more convenient means were at hand.

After the body had been well sponged the patient was quickly rubbed dry, clad in dry under-clothing, placed in a cot, and well covered with blankets.

By this time usually perspiration was established, and the patient was kept perfectly quiet.

At the same time the liq. ammon. acet., ℥ss, with from 15 minims to ℥ss of sweet spirits of nitre, or flaxseed-tea with spirits of nitre, was given every two hours, and continued until the subsidence of the febrile stage.

A cathartic, usually castor-oil, from one and a half to two ounces, was given at this time, but generally at an an earlier period, which usually had the effect of relieving the severe pains in head.

Quinine was not given until the violence of the attack was over, and then only in two-grain doses every four hours.

Ice was allowed to be chewed to relieve thirst, and when nausea was complained of the carbonic-acid gas, as contained in champagne, made very cold, and given in small quantities, was found grateful, and very efficient in relieving the nausea and in giving the necessary support to the system.

Counter-irritation by means of dry-cups, and sinapisms also, were persistently applied to the epigastrium.

The fatal results of suppression of urine required close attention from the first, and flaxseed-tea with spirits of nitre were used, and dry-cups were applied to back over the kidneys.

In regard to the origin of the yellow fever on the Ticonderoga, there seems as yet to be some doubt. At the time of its outbreak on the ship the city of Key West was said to be perfectly healthy, not a single case of yellow fever having been reported.

It was said that Mr. White on one occasion visited a steamer which had just arrived from Havana, and as yellow fever was prevailing at Havana at the time, it was believed that he con-

tracted the disease on board of that steamer. It, however, has since been denied that he was on board of that ship.

That the germs of the disease reside within the ship I am well convinced.

The first case of yellow fever occurred on the 8th of August, and no other cases presented themselves until the 26th of that month. On the 25th of August, I think it was, the hold of the ship was broken out to clean bilges, and four cases of yellow fever occurred the next day. This may have been a mere coincident, for if I remember correctly, the same general breaking out of hold and cleaning bilges had been done twice before at Key West without any bad results following; still, as these cases of yellow fever referred to followed so quickly after the hold had been broken out, I am induced to believe that the second outbreak of fever was in a measure due to it.

Now, in regard to the best means of getting rid of these germs, and of purifying the ship, I am of the opinion that if by steaming the ship can be heated to a temperature of 180° Fahrenheit the germs of disease will be destroyed; besides, this method would clear the ship of all vermin.

The thermal death-point of living matter has been placed by investigators at a much lower degree of heat than that.

Steaming ships to destroy the germs of disease, especially those of yellow fever, has been practiced on several occasions, and I believe with satisfactory results. It was practiced on board the United States steamer Don, and I have also been informed on several vessels on the Mexican coast.

If a temperature of 180° Fahrenheit cannot be attained, I would suggest that some time during midwinter the hold and store-rooms of the Ticonderoga be broken out, and all articles likely to retain the germs of disease, such as clothing, blankets, &c., be burned, and then, after the hold and store-rooms had been kept open for a while, that the hatches be closed and the

ship filled with sulphurous acid, as generated from burning sulphur.

In closing this report, I wish to express my regret that the notes taken of the yellow fever as it occurred on the Ticonderoga are so imperfect. Cases of this kind require such constant attention and such careful nursing that the notes taken at the time were necessarily hurried ones.

My whole time and attention were occupied with the sick.

YELLOW FEVER ON BOARD THE U. S. S. MONONGAHELA,

AT

RIO JANEIRO, DURING THE MONTHS OF APRIL AND MAY, 1875.

By A. A. HOEHLING, M. D.,
SURGEON U. S. NAVY

The Monongahela arrived at Rio de Janeiro on April 19, 1875, from Bahia. The vessel had been absent from Rio since October 1, 1874, having been to Kerguelen Land in connection with the transit of Venus. On her way to Rio she stopped, from April 1 to 4, at Pernambuco, Brazil, where the yellow fever then prevailed to a moderate extent. She was anchored between four and five miles from the town or nearest land, and the health on board remained good.

On April 9 she arrived at Bahia, Brazil, where no yellow fever then existed, and left on the 11th for Rio de Janeiro. A very bad bilge was observed previously to the time of the arrival of the ship at Pernambuco until we reached Rio. All efforts to remedy this were made, but with less success than could have been wished. A new stock of disinfectants was purchased at Bahia and freely used, the bilges were cleaned two and three times a week, but the smell was not entirely removed. During this time the patent bilge-pumping machine, which is put in operation by the rolling of the ship, was out of order and undergoing repairs. As soon as the repairs were completed the smell began to disappear, and this gave me a very favorable opinion of that machine.

On April 21 Rear-Admiral William E. Le Roy hoisted his

flag on board this ship at Rio de Janeiro, bringing with him his staff. They had arrived in the harbor of Rio on board the United States flag-ship Lancaster from Montevideo on April 10 preceding.

On April 22, at 2 o'clock a. m., Mr. Samuel M. Coleman, secretary to the commander of the squadron, one of the staff above mentioned, was seized with a severe chill and vomiting, followed by fever and pain in the back, with trifling perspiration before morning. Then a slow fever set in, and toward evening a remission, like that met with in remittent fever. Bowels very loose; tongue moist, and not much furred. Pulse 120 to 112 to 114; temperature 104° Fahrenheit. His urine was copious. On April 23 his fever increased; on the 26th he was jaundiced; and at 6.30 p. m. on April 27 collapse set in. Urine albuminous. At 12 p. m. true black vomit appeared, and he died at 1.17 a. m. on the 28th of April.

Assistant Surgeon W. F. Waugh had not been well for some days before Mr. Coleman came on board. He had suffered with pain in his bowels. On the forenoon of April 27 he watched with Mr. Coleman, but about noon felt badly and went to bed. That evening he complained of the pain in his bowels, but being feverish I at once suspected yellow fever. On April 28 he had a pulse of 136; temperature 102° Fahrenheit; tongue moist, slight white fur; indented by the teeth. April 29 copious albuminous deposits in his urine, which is scanty; pulse 136; temperature 100° Fahrenheit; moderate jaundice; discharges from bowels bilious. He had one spell of white vomiting this morning. Seven o'clock p. m. pulse 120; temperature 98.5° Fahrenheit. Perspires very freely. Both the above were undoubtedly cases of yellow fever. Mr. Coleman's case began like remittent fever, which deceived me for a time.

On April 29 Hans J. Schmidt, seaman, was attacked, and on May 1 Thomas J. Cusack, ordinary seaman, and Boatswain

John S. Sinclair. All the above were sent to a private hospital on shore on this day, and all infected bedding and clothing were destroyed, disinfectants being used freely.

On May 2, the following men were attacked by the disease and at once sent to the hospital, and all infected articles destroyed: George T. Miller, ordinary seaman, Patrick Smith, ordinary seaman, Lorenzo E. Church, engineer's yeoman, August Rasmussen, landsman, and Carpenter Augustus O. Goodsoe; making one death on board, and nine patients sent to the hospital on shore. At about 1.30 p. m. on May 2 the ship was ready for sea, and we left Rio at once. We steered south, with the object of reaching a temperature below 70° Fahrenheit. No fever appeared until May 5, when I was attacked by the disease, and on May 6, William K. Rugg, ship's writer, was also seized. Owing to a pure cool air, both cases proved mild, and yielded to treatment in three days, leaving some irritability of stomach and weakness behind for a time. As we now have a temperature of 64° Fahrenheit, and no new cases have appeared, I feel that we are probably rid of the disease for the present. I have no doubt that both Rugg and I received the poison into our systems while the ship was still at Rio de Janeiro, Brazil.

The treatment pursued was that mostly used at Rio de Janeiro. First, the bowels are well opened with castor-oil, and then kept open with small doses of Murray's fluid magnesia to which a few drops of tinct. nuxcis vomicæ may be added. Give potassæ nitras, gr. xx, in barley-water, during the course of the day, to which small doses of tinct. aconiti rad. may be added if the fever is very high. If vomiting comes on, produce a blister over the pit of the stomach, and give champagne and small pieces of ice; I found lime-water gave relief. If symptoms of uræmia occur, apply a turpentine stupe over kidneys, and hope for the best. The diet must be liquid until the fever has passed off; gum-water, rice or barley water, milk; later, mutton-broth,

chicken-broth, and arrowroot-gruel; last, but most important of all, is the necessity of sweating until all danger has passed away; the patient must be covered up to the neck with enough blankets to make him perspire freely; he must not allow his arms or hands to be above the blankets—not even a finger. This is the most difficult part of the treatment, and one most often disobeyed by the patient. In my own case, when albuminuria appeared, with pain in the kidneys, I had three dry-cups applied over each kidney; this appeared to give me much relief.

This is the third time our ship has had the yellow fever on board, at Rio de Janeiro, since February, 1874, and we had erysipelas on board at Kerguelen Land in December, 1874. On all these occasions the diseases have been driven out of the ship by the prompt destruction of all infected articles, the lavish use of carbolic acid and sulphate of iron, as well as water, paint, and whitewash, and the removal or isolation of those affected.

In my sanitary report for the year 1874, I recommended Cape Frio as a sanitarium for vessels from Rio de Janeiro, but the United States steamer Brooklyn recently developed the fever at that place; and I am now of opinion that nothing short of a cruise to the south, until 68° Fahrenheit or lower is reached, will prove surely efficient in eradicating the disease. The stores from Her Majesty's store-ship Egmont, about which ship I wrote in my sanitary report above mentioned, have been placed on Enchadas Island, where our store-house is situated. There is yellow fever on the island, and we dreaded to take our stores on board for fear of importing more disease into our ship. I was informed that the hired men who broke out the lower hold of the Egmont when her stores were moved died in numbers of yellow fever.

The water in Rio Harbor was dark and foul this year, and the city had a smell even worse than while we were there last year.

That we escaped with twelve cases of fever during this epidemic I attribute to our speedy departure from the infected

harbor of Rio de Janeiro, where the disease has become endemic. During June, July, and August, less fever prevails there than in other months. From January 1 to May 31, the disease is very prevalent. It is claimed on shore that most of the fever is found among the shipping, except in epidemic years, when the land also has a good share.

AN ACCOUNT

OF

THIRTY-SEVEN CASES OF PTYALISM OCCURRING ON BOARD OF THE U. S. S. WACHUSETT.

By GEO. W. WOODS, M. D.,

SURGEON U. S. NAVY.

When the Wachusett fitted out for her European cruise, in 1871, she was provided with a patent bilge-pump and fog-horn combined, which was supposed to work automatically whenever the vessel rolled. The essential feature of the apparatus was mercury, confined in a curved tube, which, as it rushed backward and forward with the movement of the ship, was made to act as a piston in opening and closing the pump-valves. Not working satisfactorily, most of the apparatus was removed after a while, leaving the mercury in its place; but no means were employed to prevent its escape, although the extremities of the curved tube were thus left open on either side of the berth-deck, just forward of the galley.

During the recent passage of the Wachusett from New Orleans to Key West, the ship was caught in the edge of a cyclone which blew for several days. On the evening of the 17th of November, 1874, the gale was at its height, and the ship lying-to under close-reefed fore-sail, maintop-sail, and fore storm-stay-sail, with all hatches battened down, rolling fearfully in the trough of the sea.

During the night, about midnight probably, the ship gave one roll more complete than any preceding it, and nearly the entire quantity of mercury contained in the tube of the patent pump, amounting to about one hundred pounds, was discharged

upon the berth-deck, rolling down into the lee scuppers on the port side. From this position it swashed backward and forward, distributing itself in small globules all over the deck, rolling under the galley, but concentrating itself, to a certain degree, on the port side of the deck, forward, where the marines have their mess-chest and locker. The mercury was necessarily allowed to roll around in this manner until daylight, when an attempt was made to secure it, and about ninety pounds were recovered. A large quantity, however, remained upon the deck, where it assumed an oxidized form to some extent, appearing like streaks of plumbago; and during the storm, which lasted five days, was tracked around and mixed with the grease and dirt which accumulated during this period. The majority of the men were barefoot, and, with those who neglected any cleaning process, the adherence of this novel mercurial ointment to their feet and limbs for several days, aided by the friction of exercise, performed all the work of inunction, sufficiently so to produce ptyalism.

This condition of affairs, or the danger to which the men were exposed, was not even suspected by the medical officers of the ship, to whom no report was made of the accident. All the hatches were battened down, and, in attending "sick-call" on the darkened berth-deck, nothing was observable but a general condition of filth, which could not be prevented during the storm. As soon, however, as it was made known, all proper means to get rid of the mercury was advised and carried out.

On the 19th instant, at "sick-call," the first patients affected with ptyalism presented themselves, eight cases reporting, and it was easily referred to the proper cause. On the 20th two additional cases appeared; on the 21st five cases, and on the succeeding day six cases, making in all twenty-two cases under treatment, representing one-fourth of the ship's company. In addition to this number, at least fifteen men complained of

slight symptoms of ptyalism, but did not submit themselves to treatment.

The patients under treatment may be thus classified for convenient reference in the few succeeding remarks:

Marines	7	
Marines, (mess-cooks)	2	
		9
Shipped men	8	
Shipped men, (mess-cooks and ship's cook)	5	
		13
Under treatment		22
Not under treatment		15
Total affected		37

The marines were exposed to the mercurial influence by sleeping on the deck in wet clothing and with bare limbs, at a point where the mercury had a tendency to concentrate itself, on the lee side of the deck, around their mess-chests.

In addition to this exposure, a number of them ate of the "scouse" which was capsized upon the deck at breakfast-time on the succeeding morning, where the mercury lay in considerable quantities, and which became mixed with the food to such an extent as to give it a metallic taste, recognized by all. Thus the mercury was introduced directly into the system in its metallic form, the effects following speedily, and much sooner than in the other cases, the first admissions to the list being entirely of marines. With the seamen and petty officers, the effects are attributed to walking continually on deck with bare feet where the mercury was distributed, no attempt at scrubbing decks being made during the storm, and personal cleanliness being almost impossible. Among the seamen and marines the

worst cases were the mess-cooks, and, with the ship's cook, they represent the most serious admissions to the list. In these instances inhalation of the volatilized mercury, which rolled beneath the hot galley and amalgamated the copper and zinc bed on which the galley rests, may be added to the influence of direct absorption from contact, to which all were equally exposed.

It is barely possible that the amalgamated tin of the mess-gear may have had something to do with the result, but this is not probable, as so many have escaped the mercurialization, while it is certain that all the mess pots and pans of the port messes were equally covered with amalgam.

It has been impossible to trace with any satisfaction the immunity from affection of so large a number of the crew where nearly all were exposed to the mercurial influence; but it seems to be comprised in greater cleanliness, the wearing of boots or shoes, sleeping in hammocks instead of upon the wet decks, and the refusal to eat any food suspected of containing mercury.

All of the patients, without exception, complained of pains in the back and limbs, but especially of a supraorbital pain of great severity. There were no febrile symptoms, and neither diarrhœa nor constipation.

Twelve of the cases were quite serious, the majority of this number being marines, who had taken the mercury with their food, the others being the mess-cooks and ship's cook. In these cases there was extensive ulceration of the gums, mucous surface of the cheeks, and also the fauces, extending deeply into the pharynx. The parotid and submaxillary glands were much swollen, the teeth loosened, the breath extremely fetid, and the discharge of saliva profuse. In a few cases superficial abscesses formed in the submucous cellular tissue of the mouth, opening and discharging a fetid pus. In the remaining ten cases under treatment, while the pains were well marked, they were not of

great severity, and the buccal symptoms were those of ordinary stomatitis, yielding to treatment in a few days.

The treatment instituted was the administration of a saline cathartic, and the internal exhibition of potassium iodide and extract of belladonna, with the use of a gargle of a solution of tincture of iodine (℥j to ℨvj of water) at first, and later one of cupric sulphate, (gr. j to ℥j of water.) The potassium iodide was given in ten-grain doses, and the extract of belladonna in the form of pills, each containing one-quarter of a grain, both three times a day. The result of this treatment was very satisfactory, particularly in the influence exercised by the extract of belladonna over the salivary secretion, to which I would call special attention. The desired result was obtained in every instance by the administration of not more than three doses, and before the pupils had become so dilated as to affect the vision to any very marked extent. In some of the milder cases one pill was sufficient.

The checking of the hypersecretion was coincident with great dryness of the fauces, and, this result being attained, only one dose of extract of belladonna was administered daily during the remaining period of treatment.

All of the patients were treated in this uniform manner, and, with but one exception, made a most excellent and speedy recovery.

RECRUITING IN THE NAVY.

BY C. J. CLEBORNE, M. D.,

SURGEON U. S. NAVY.

Our system of recruiting, lying, as it does, at the foundation of the efficiency of the Navy, naturally invests every subject, directly or indirectly connected with it, with more or less interest.

There is a very general outcry among naval officers about the worthlessness of their men, their physical incapacity and sickliness, necessitating frequent medical surveys and constant changes in the crews of almost every ship afloat. Nevertheless, few are aware of the numerous difficulties which surround those whose duty it is to prevent or eradicate the evil.

So far as inducements for sound, able-bodied men to enter and remain in the Navy are concerned, there is good reason for congratulation, when we compare the present condition of the sailor with what it was five and twenty years ago; but the trouble is, not that we cannot get good, sound men, or a sufficient number of them, but in the faulty examination of recruits at naval rendezvous and elsewhere.

The responsibility of examination is supposed to rest principally upon the medical officer, upon whom the importance of recruiting has been specially enjoined,* but in many cases the recruiting officers and the Bureaus are to blame.

In the first place, proper accommodations are not provided for the examination of recruits. Recruiting rendezvous are usually established in the "slums" of a city, adjoining sailors'

* *Vide* Instructions for Medical Officers, 1873, art. iv, p. 23.

boarding-houses, in the midst of a noisy neighborhood, and are rarely provided with sufficient room, light, or the necessary apparatus. Now, as quiet a place as possible should be chosen for the purpose, and ample provision should be made for the requirements of the officers connected with the rendezvous. At least two rooms are necessary for the examining surgeon, one of which ought to be quite large and well lighted, and provided with water-closet, urinal, standard measure, respirometer, scales, dynamometer, &c. The necessity for a good light is apparent, when we reflect upon the very critical examination required to be made of the eyes and body of the recruit. Quiet is absolutely necessary for the diagnosis of pulmonary and cardiac affections, while ample room will be found a *sine qua non* for the determination of anchylosis, locomotor ataxia in its incipient stage, stiffness of joints, &c., and for walking and running, or other evolutions necessary to determine the presence of hernia or other injuries.

Receiving-ships are totally unfitted for the examination of recruits, by reason of the noise and bustle on board; of course, the same objection will apply to sea-going vessels, but in their case it cannot be helped.

For the proper examination of a candidate some considerable time is required; indeed, it is almost impossible to determine the physical fitness of an applicant in the ten or fifteen minutes usually allotted to this duty. Not only has the examiner to satisfy himself by manipulation of the presence or absence of hernia, varicocele, enlarged testes, stricture, fistula, enlarged prostate glands, &c., but he has also to inquire into the antecedents of the applicant, in order to discover, by judicious questioning, whether he has any hereditary tendency to disease. His professional duties are therefore fully sufficient to engross all his time and attention, without being obliged to abstract his mind by writing down the various items of information upon

the "certificates of physical examination." The frequent ablutions of the examiner, during examinations, rendered necessary by the performance of his clerical duties, unquestionably cause considerable delay in recruiting, while the time thus occupied might be more profitably employed, and the examination be made much more thorough, if a clerk or writer was allowed for this purpose.

When every facility is afforded for the examination of recruits, then, and not till then, should entire responsibility devolve upon the medical officer.

It is unfortunate, however, that the officers best qualified for this duty are not always ordered to rendezvous—a result of a faulty system which deprives the Bureaus and the Department of a knowledge of the special qualifications of officers of every branch of the service for certain duties.

Unquestionably something more than mere routine medical examination is required. A certain amount of zeal and interest in this most responsible duty is necessary; but even where this is found, how often do the zeal and interest of the examiner leave him, when he finds that men are passed by order of a higher authority, who have been already rejected by him for physical incapacity!

It must not be forgotten that this is a conscientious duty involving the highest interests of the Government and of the individual, (perhaps for life,) and it should rarely, if ever, be interfered with.

I am fully aware that medical officers are frequently to blame for the superficial and careless manner in which their examinations are made; in fact the books and lists of every vessel and naval station are filled with inaccuracies in names and descriptive marks, which cause much confusion in the settlement of pension and other claims. Surely there can be no excuse, save that of indolence or carelessness, for writing a man's name as

"Louis Elvorde," when it should be "Louis Halrorden;" but in a case where a man is unable to write his own name, I do not see that it matters much whether Thompson be spelled with or without a "p," the nick-names of Brown, Greene, &c., with or without an "e," so long as the "*idem sonans*," as Blackstone terms it, is preserved. The orthography of names is altogether arbitrary, and any one familiar with the origin or use of surnames must be aware that members even of the same family not infrequently spell and write their names differently, always, however, preserving the original sound.

In the case of foreigners, however, it is always best that the applicant should spell his own name, though I know of more than one instance in which the same foreigner has spelled, and even written, his own name differently on the same occasion.

Far more important than names are the descriptive marks on the body of the recruit, the color of the hair, eyes, complexion, &c., and the permanent marks or scars, congenital and otherwise, though it will be found that on almost every reshipment, the color of the eyes, hair, &c., will differ, a fact which may be due to the very great prevalence of color-blindness among professional men.

Even the regulation* which requires a general muster of the crew, at which the surgeon, paymaster, and executive officer are required to be present to verify the "descriptive lists," has failed to rectify these difficulties, so that, after all, we must depend upon the primary examination.

I need not enter into detail about the duties of medical examiners. They have been fully laid down by Dr. Gihon, in his recent able work on "Naval Hygiene," and whoever follows his system of physical examination may be sure of escaping imposition.

I beg, however, to offer a few suggestions for the better pro-

* *Vide* Regulations for the Government of the Navy, paragraph 166.

tection of the Government, though even in this I find I have been somewhat forestalled by the writer above mentioned.

It must be admitted that, no matter how skillful, careful, and conscientious a medical examiner may be, he is still liable to be imposed upon by men who have made it their business to practice imposition upon inspecting officers. Men may be found on board every sea-going ship who have managed by a variety of expedients or deceptions to "pass the doctor," and who, soon after their arrival on a foreign station, present themselves with chronic or incurable diseases, for which they have to be admitted on the sick-list. But the evil does not stop here. These men are invalided home or discharged the service, and in the course of a few months they again find their way into the Navy, to be again invalided and again re-enlisted, and thus men may pass years in the service without ever completing a cruise. I know of instances in which men boast of their success in this line of deception, and claim that they have a perfect right to do so, upon the ground that the "Government owes them a living." Some months ago a private of marines, named Williams, informed me that he has been discharged and re-enlisted seven times, though he was perfectly well aware that, in consequence of a nervous affection, (the result of a bullet-wound received at the battle of Bull Run,) he was really unfit for duty. I have met with men with fistula in ano, and in perineo, with asthma, hæmoptysis, heart-disease, hernia, varices, dislocations, &c., who have successfully imposed themselves over and over again upon the inspecting officers of receiving-ships and rendezvous; and I suppose this is the experience of almost every medical officer in the service. I have at present on board this ship a case of hæmoptysis, one of varix, one of epilepsy, and one of fistula in ano, all of whom were thus affected before they enlisted; and yet these men unhesitatingly sign the certificate (Form Q) that they had "no disease" that they "knew of or

likely to be inherited," and that they knew of "no reason" why they "should not be passed."

So little use is this certificate in its present form that it might as well be done away with, as in no wise does it assist the medical examiner, nor protect the interests of the Government.

To remedy this evil, I would suggest that the said certificate be made in the form of an oath—such as the one appended to this paper—the signer agreeing that in the event of his making a *fraudulent* statement, he shall waive all claim for pension or other remuneration, agree to be discharged the service in any port, foreign or domestic, and to forfeit all pay that may be due him from the time of his enlistment to the time of his discharge. This would speedily put a stop to impositions of this nature; in fact, it is the only effectual way in which the Government can protect itself from these unscrupulous leeches who swell our sick-lists, fill up our already too diminutive sick-bays, destroy the efficiency of our ships, and occupy the place of better men.

In this connection, I would also suggest that every honorable or other discharge given to an enlisted man of the Navy or Marine Corps be signed and indorsed by the medical officer of the ship or station, with a brief statement of the man's general health and his physical condition at the time of his discharge. This is done, I believe, in our Army, and certainly it would prove a valuable aid to recruiting and examining officers. There certainly ought to be some way of ridding the service permanently of old impostors, and it might be a good plan in the case of well-known offenders to tattoo a very small mark on the right or left scapula, that they may be at once recognized as men unfitted for future enlistment in the Navy. The following oath and certificate of physical examination is suggested for use in all future enlistments in the Navy:

CERTIFICATE OF PHYSICAL EXAMINATION.

U. S. ———, ———, 187 .

I, ———, on presenting myself to be entered as ———, U. S. ———, do solemnly swear—

1st. That I am not subject to fits, chronic rheumatism, spitting of blood, or varicose veins.

2d. That I have no disease that I know of, presently concealed or likely to be inherited.

3d. That I am not suffering from the consequences of any former disease or hurt.

4th. That I have no stricture, internal piles, falling of the bowel, fistula, or rupture.

5th. That I know of no reason why I should not be passed, and that I do not, by this act, acquire or confirm any claims to pension; and further, that in the event of this oath being proven false, I agree to be discharged in any port, foreign or domestic, and to forfeit all pay due me from the time of my enlistment to the time of my discharge.

Sworn and subscribed to before me.

———.

I certify that the above oath was signed advisedly, and that I have carefully examined the applicant, and I hereby ——— him as ——— for active service ashore and afloat; also, that the following is a correct sketch of his existing condition, according to my best knowledge and belief, viz:

1. Name, ———.
2. Grade at which shipped, ———.
3. Native of ———.
4. Age, ———.
5. Body-weight ——— lbs.
6. Height, ——— feet ——— inches.

7. Chest-measure, max., ——— inches; min., ——— inches.
8. General development, ———.
9. Intelligence, ———.
10. Hair, ———.
11. Eyes, ———.
12. Complexion, ———.
13. Head and face, ———.
14. Abdomen and groins, ———.
15. Private parts, ———.
16. Spine and joints, ———.
17. General surface, ———.
18. Remarks, ———.

——— ———,
Surgeon U. S. Navy.

DESCRIPTION

OF AN

AERATOR FOR THE AERATION OF WATER ON SHIP-BOARD, WITH DIAGRAM.

By BENJ. F. GIBBS, M. D.,

SURGEON U. S. NAVY,

SURGEON OF THE FLEET, SOUTH PACIFIC SQUADRON.

Having seriously felt the inconvenience of using unaerated water on shipboard, I have devised a plan for making distilled water palatable by means of an aerator which shall receive its air through a wind-sail on deck. I was particularly constrained to devise this for reasons experienced on board this ship,* viz: The water from the distilling-apparatus passes directly into the water-tank situated in the hold of the ship, and is there received at a temperature but little below the boiling-point; if the distillation is carried on rapidly, which is usually the case, the water received into the tanks in this condition absorbs the surrounding air of the hold with all of its impurities, and as the hatches are closed every night, this vitiated air can plainly be tasted in the water. The absorption of this air, arising from perhaps a filthy hold, containing germs of disease, may be the means of impregnating the water, which I believe to have been the case on board this ship, and was the cause of numerous cases of cholera morbus which occurred as soon as we reached the warm weather of the West Indies, and before the bilges had been thoroughly cleaned.

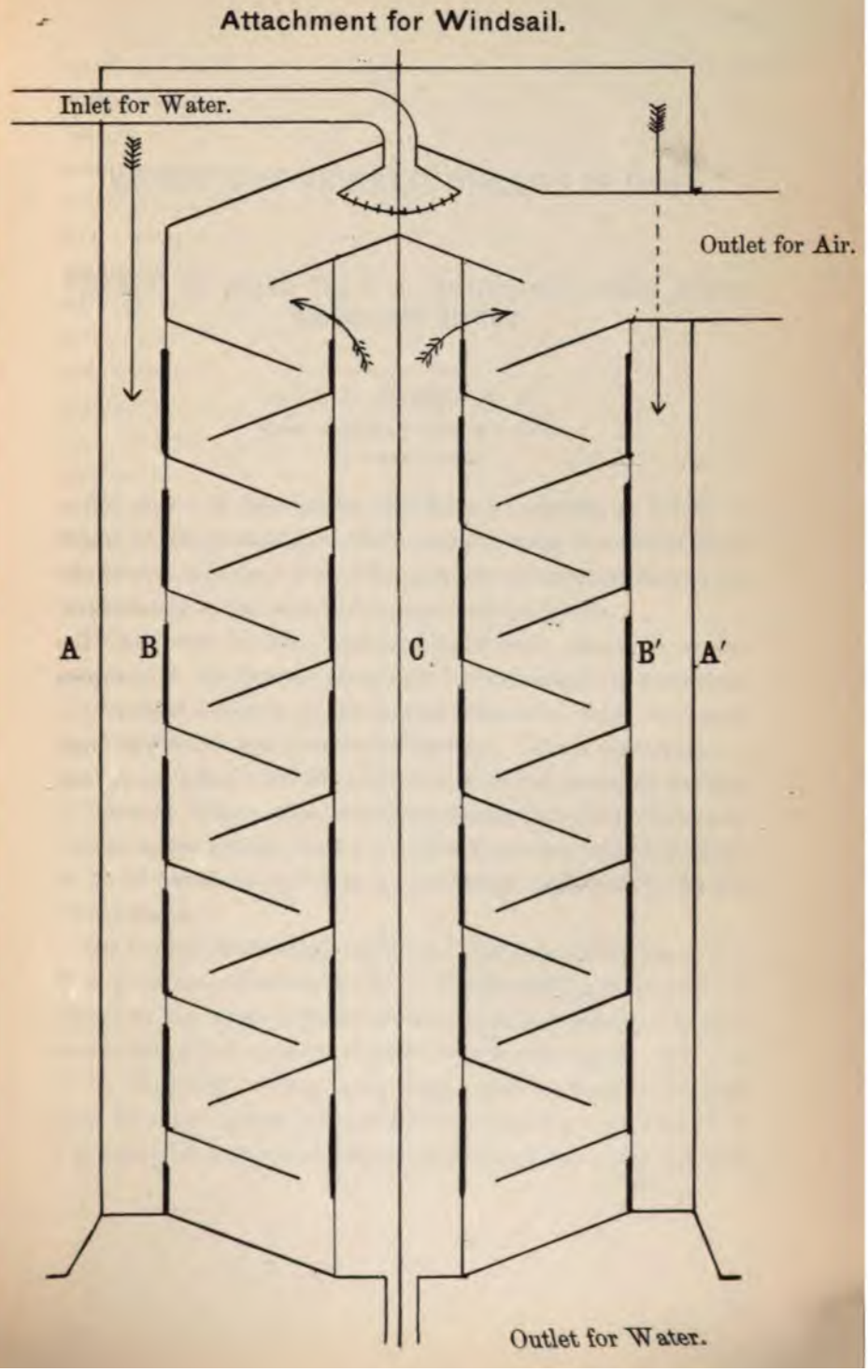
* United States flag-ship Richmond, South Pacific squadron, 1873.

The cases of cholera morbus could be accounted for in no other way, as the men were confined to their regular sea-ration while the ship was employed in various surveys. The accompanying diagram is a longitudinal section, and will explain itself. It consists of two cylinders, one within the other, and it is better that they should be made of tinned copper. The outer cylinder A A has the wind-sail attached to and snugly fitted to its upper end. It has two openings, one for the admission of water, and the other for the exit of air after passing through the inner cylinder B B. The latter has its circumference formed of the flanges of inverted conical disks, which are held in position by four upright rods to which they are secured, leaving between each disk circular open spaces for the admission of air. Alternating with these are similar conical disks and flanges, their convexity upward, forming a central tube, C, through which the air passes to the outlet. The first of these conical disks at the top is, however, complete, and receives the water on its convexity from the water-inlet. By this arrangement the water is broken fifteen times in its descent, and cannot fail to be properly aerated.

The size of this aerator should be four and a half feet high and thirty inches in diameter. It may be placed anywhere where it can receive a fair lead from a wind-sail.

AERATOR.—LONG: SECTION.

$1\frac{1}{2} = 1$ Foot.



REPORT UPON VENEREAL DISEASES IN JAPAN,

AS

OBSERVED ON BOARD THE U. S. HOSPITAL-SHIP IDAHO DURING TWENTY-TWO MONTHS.

By J. H. KIDDER, M. D.,

PASSED ASSISTANT SURGEON U. S. NAVY.

The object of the reporter has been to present, as briefly as might be, the statistics of the unusually large number of cases of venereal disease which fell under his observation during the continuance of the hospital on board of the Idaho.

To this end he has been at considerable pains to secure accuracy in the figures presented, having carefully condensed the medical journals of the period embraced, and compared many scattered notes entered elsewhere. These journals have been so fully and carefully kept, thanks to the thorough method of Surgeon Gihon, that, notwithstanding occasional shortcomings in minor details, the facts herewith presented are thought to be of sufficient value to justify their presentation to the Department.

The United States ship Idaho was put in commission at the New York navy-yard on the 3d of October, 1867, to be used, as stated by the letter of instructions to Surgeon Gihon, "in part as a hospital and store-ship for the Asiatic squadron." She was to be stationed at Nagasaki, Japan, and to receive the sick from all other vessels belonging to the squadron, for whom she was expected to provide hospital accommodation. To this end

the entire main-deck had been cleared of its usual obstructions; store and bath rooms had been built forward; and offices, store-rooms for medical supplies, and nurse's and apothecary's quarters fitted up aft.

The ship being considered quite useless for all ordinary purposes, it was the original intention that large, square ports should be cut, upon her arrival in Japan, opening upon the main-deck, to increase the supply of air for the sick. It was also proposed that the former wardroom and cabin of the ship (upon the main-deck) should be devoted to the reception of invalid officers, another wardroom and cabin having been erected upon the spar-deck for the accommodation of the officers who were to take the ship out. Owing to some misapprehension, however, the ports were never cut, nor was the main-deck wardroom ever fitted for invalid officers. The sick suffered considerably from deficiency of air-supply, but no sick officers were sent on board during the continuance of the hospital, and therefore the quarters referred to were not needed.

The entire main-deck had been painted and grained in imitation of oak, and fifty iron bedsteads and furniture, with a very full outfit of supplies and apparatus of every necessary description supplied, enabling a hospital to be established on board, with all its accessories, upon arrival at the port of destination. The arrangements were planned and carried out under the direction of Surgeon (late Surgeon-General) James C. Palmer, at that time in charge of the naval hospital at New York, and proved to be entirely complete.

Acting Volunteer Lieut. Com. Edward Hooker was ordered to command the ship; the medical staff consisting of Surgeon A. L. Gihon, in charge, Mr. Charles L. Fisher, apothecary, and myself, (assistant surgeon.)

On the 1st of November, 1867, the Idaho set sail from New York bound to Rio de Janeiro, which port she reached Decem-

ber 10 following. Remaining in Rio de Janeiro three weeks, she set sail again December 31, and, after an unusually protracted voyage, attended by much inconvenience on account of calms and deficient water-supply, reached Nagasaki on the 19th of May, 1868, having been in port but ten days on the way, viz, three days at Cape Town and one week at Dielli, (Portuguese portion of the island of Timor.)

On the 18th of June following Surgeon Gihon officially announced that the medical department of the ship was prepared to receive patients from other vessels, and to issue medical stores (of which a large supply had been placed on board for this purpose) to the rest of the squadron. The special-diet hospital-mess was organized July 1, and continued in operation during the existence of the hospital. July 18, 1869, the ship was ordered to Yokohama, where she arrived safely; and August 4 following the hospital was closed by order of the commanding officer, Commander B. B. Taylor, after an existence of about fourteen months. A number of men whose terms of service had expired, and others condemned by medical survey, were put on board, together with a large amount of freight intended for the United States, and on September 19, 1869, the ship sailed for San Francisco, via Hong-Kong and Panama. The next day (20th) she encountered a severe typhoon, whereby she was completely and permanently disabled, and put back to Yokohama, where she still (December, 1872) lies, housed over, as store-ship for the squadron.

The subject-matter of the following report covers the period from the sailing of the Idaho from New York, November 1, 1867, to her departure for Hong-Kong, homeward-bound, September 19, 1869, about twenty-two months. During fourteen months of this time (from June 18, 1868, to August 4, 1869) the hospital was in operation on board.

In the entire period of twenty-two months there were 417 ad-

missions to the sick-list from all sources, with a total loss to the Government of 9,399 days' labor, and an average loss per patient of 22.54 days. Of these admissions 162, or 38.13 per cent., suffered from venereal diseases, with a total loss, while on board the Idaho, of 5,099 days' labor, and an average loss per man of 31.48 days. Of these cases of venereal disease 101 were classed as syphilis, suffering a total loss of 3,703 days, and an average loss of 36.66 days per man; while 61 admissions classed as gonorrhœa showed a total loss of 1,396 days, and an average loss per man of 22.88 days.*

These figures, sufficiently alarming in themselves, acquire additional importance when the fact is considered that of the whole number admitted 58 came from other ships than the Idaho, on board of which treatment had been applied for a longer or shorter time not included in the above calculation. Forty-four of these cases were classed as "syphilitic," and 14 as "gonorrhœal." In 17 instances the duration previous to admission has been ascertained with more or less accuracy, amounting to the sum of 4,985 days of disease previous to the commencement of these statistics; an average loss per man (excluding one stricture-case of two years' standing) of 250.3 days. It would not be just, however, to apply this very large average, based upon so few reports, to the whole number of patients admitted from other ships than the Idaho, since cases of extremely long dura-

* The committee appointed by the British admiralty in 1864 to investigate the causes, &c., of venereal diseases in the Army and Navy found that in 1862, in the English army at home, the admissions were 291 per 1,000 of strength, and 29 per cent. of the admissions from all sources. "The average number under treatment was 19.1 per 1,000, a loss equal to the whole force for one week."

In the navy "the admissions were 125.1 per 1,000, or 12.5 per cent. of all admissions, with a loss of 586 men per day, equal to 9.9 per 1,000, and corresponding to the total loss of the crew of such a vessel as the Royal Oak." (Report, p. 25.) This degree of injury was looked upon as so alarming as to call for the very stringent measures contained in the "contagious-disease act."

tion would be more likely to suggest mention to the surgeon writing the hospital-ticket than those which nearly approached the average. An unknown but very large proportion of this time was of course lost to the Government.

Considering, in addition to these facts, that, owing to the great extent of coast patrolled by the Asiatic squadron, an extremely small proportion of all the venereal cases ever found their way to the hospital-ship at all, the importance of this class of diseases as a cause of loss to the Government seems to need no further argument.

The statistics which follow, based upon the 162 cases mentioned above, relate, in cases classed as syphilis, to—age; ship from which admitted; nature of disease, (primary or consecutive;) period of incubation; site of the original sore; sequelæ and complications; character of eruption; result; number of days lost; duration, and treatment. In diseases classed as gonorrhœa, note has been taken of age, ship from which admitted, period of incubation, sequelæ and complications, results, number of days lost, and treatment. Necessarily, under many of these heads, the figures are defective, since few surgeons are in the habit of noting on the hospital-ticket, the only record available, such facts as the period of incubation or duration previous to reporting at sick-call.

Age.—The average age of patients admitted for syphilitic diseases was found to be about 28 years and 6 months, and of gonorrhœa cases, a little less than 25 years. Sailors habitually understate their ages, often stating their age to be the same on re-shipping as that given at the previous shipment. It was remarked, however, that syphilis was, as a rule, the disease of more mature life than gonorrhœa.

Ship from which admitted.—The admissions from the different ships, with their total strength in men, on the 1st of January, 1869, are given in the following table:

Ship.	Admissions classed as syphilis.	Admissions classed as gonorrhœa.	Strength January 1, 1869.
Delaware	6	1	466
Oneida	4	.....	175
Iroquois	7	.....	180
Ashuelot	14	5	153
Monocacy	6	6	167
Aroostook	5	.....	74
Unadilla	1	.....	78
Idaho	57	48	126
Maumee*	1	1	76
Total	101	61	1,495

*The strength of the Maumee could not be obtained officially, and is estimated by averaging those of the Unadilla and Aroostook, vessels of nearly the same size.

Of the admissions from the Idaho, classed as "syphilis," six were re-admissions, belonging properly to other ships, but awaiting transfer. Having suffered relapse, they were admitted as belonging to the Idaho, upon the books of which their names were borne. Deducting this number, we find that there were admitted from the ship's company of the Idaho, for syphilitic diseases, 51, and for gonorrhœal, 48 cases. Now, the Idaho being rarely in company with the rest of the squadron, a very large majority of men affected with venereal diseases, especially those suffering from simple sores and gonorrhœa, were treated on board of their own ships. There was no reason to suppose that a larger proportion of the Idaho's crew suffered in this way than of men attached to other ships cruising in other parts of the station. Applying the proportion of admissions from the Idaho to the complements of the other ships, we find, as the approximate number of admissions for venereal diseases in the whole squadron during twenty-two months, as follows:

Ship.	Admissions classed as syphilis.	Admissions classed as gonorrhœa.	Strength January 1, 1869.
Delaware	189	177	466
Oneida	71	66	175
Iroquois	73	69	180
Ashuelot	62	58	153
Monocacy	68	64	167
Aroostook	30	28	74
Unadilla	32	30	78
Idaho	51	48	126
Maumee	31	29	76
Total	607	569	1,495

That is to say, about 78.66 per cent. of the whole strength of the squadron. A large allowance is to be made, on the one hand, for frequent re-admissions of the same chronic case; and, on the other hand, for the fact that the Idaho, from the sick-list of which the foregoing proportions are calculated, was really, for six months of the twenty-two, not exposed to the special dangers of the Asiatic station, being on her way from New York. The same consideration is to be taken into account with regard to the Delaware.

SYPHILIS.

Under this head have been grouped, for convenience' sake, 101 cases, including all sores upon the genitals, whether infecting or not, as well as all cases of the later constitutional manifestations. Upon admission to the hospital-ship they were entered as follows:

Chancroid, (4 multiple and 1 complicated with gonorrhœa,) 30; consecutive syphilis, 60; primary (infecting) sore, 7; adenitis, 1; gonorrhœa, (roseola appearing in fifteen days,) 1; doubtful, 2.

Of those entered as suffering from chancroid, 3 afterward manifested constitutional disease. In one case this occurred after an interval of eleven months, during which the patient had enjoyed,

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and no doubt taken advantage of, every opportunity for contracting the disease anew during the cruise of the ship on which he was serving, among the Chinese ports. On admission roseola, an early secondary eruption, was just fading. In the second instance, there was no evidence of constitutional disease, neither eruption nor nodes, beyond the complaints of "pains" on the part of the patient, who was strongly suspected of malingering. The hospital-ticket stated that syphilis had been contracted at Shanghgi five months previously. The third case, however, was undoubtedly an instance of erroneous diagnosis, constitutional manifestations following a supposed chancroid, with a suppurating bubo. Probably the virus of syphilis was received simultaneously with the pus from a chancroid. The case entered as "complicated with gonorrhœa" is but one of several attended by this complication, but at a later period of the disease.

Of the 60 cases entered as "consecutive syphilis," 23 were admitted from the Idaho, 6 being instances, common in the Navy, of men who had failed to report their previous lesions, treated themselves with "bluestone," and had come to the doctor only upon the appearance of the later absolutely disabling symptoms. Of the remainder, 5 were the results of primary infecting sores, contracted while the patients were attached to the ship; 4 were re-admissions of cases belonging to other ships, but temporarily discharged from the sick-list; 1 was the sequel of the case reported as "doubtful," and not at first supposed to be syphilitic; 6 were re-admissions of the same case of erroneous diagnosis noted above, and one was a very old chronic case, suffering a temporary exacerbation.

All but one of the persons entered as affected with "primary (infecting) sore" suffered in due course of time from constitutional disease; that one terminating in a suppurating bubo and speedy recovery. The one case of adenitis was a re-admission, following a supposed non-infecting sore over the sym-

physis pubis. The sore was at first thought to be a boil, but was followed by tonsillitis, a cachexia believed to be syphilitic, and induration of the glands below Poupart's ligament. There having been no other signs or symptoms of syphilis, the diagnosis must remain doubtful. The supposed gonorrhœa which was followed so unexpectedly by roseola was probably due to urethral chancre. Two instances of "doubtful" disease represent but a single patient, who was re-admitted after having been discharged from the sick-list. He reported, denying venereal exposure, with a non-indurated ulcer over the symphysis pubis, near the root of the penis, and slight urethritis; and was discharged, after 21 days, apparently well. Five weeks afterward he returned, the ulcer having re-opened, and was again discharged, after 19 days, apparently well. Ten days later he reported with tonsillitis, extensive ulceration of the pharynx, and nocturnal pains. In this instance, as in that noted on page 508, wherein the sore occupied the same locality, there was no eruption, no induration of the cicatrix, or other evidences of syphilis than those mentioned, and complete recovery followed forty days' further treatment. The lengthy period of incubation, considered with these very anomalous symptoms, must leave the diagnosis of this case also very doubtful, although the facts were explained at the time on the hypothesis that the skin covering the pubes, overlying areolar tissue, probably is much less likely to present specific induration than that of other parts; a supposition upheld by the reputed fact that infecting sores of the external portions of the labia and of the pubes of females rarely or never are found to be so indurated.

It will thus appear that in 101 admissions for diseases classed as syphilis, there occurred 5 errors in diagnosing the true nature of the primary lesion; covering, by re-admissions, 11 admissions. Three times (including the two doubtful suprapubic sores) were infecting ulcers supposed to be chancroids; once

an indurated sore proved to be non-infecting, and once a urethral chancre was overlooked. Error occurred less frequently when constitutional disease was predicted than when the prognosis was favorable, and this for the reason, as I believe, that the typical Hunterian chancre (a comparatively rare lesion) is almost unmistakable and is always diagnostic, while there can be very little doubt that the syphilitic virus is capable of infecting the system without clearly manifesting itself (to our present means of diagnosis) at the site of the initial lesion. In the latter cases the surgeon naturally wishes to persuade himself and to assure his patient of immunity from the sad consequences which, after all, occasionally follow. Recognizing the fact that there undoubtedly are venereal ulcers of which we have not yet the means of invariably determining the essential nature, it would seem that the dispute as to the unity or duality of the venereal virus should resolve itself into a difference in the manner of regarding the same phenomena. For it requires no stretch of the imagination, or supposition of novel phenomena, to believe that the same poison impregnates different individuals, or different parts, producing sometimes an indurated and sometimes a non-indurated ulcer. Possibly now the character of the underlying tissue, and again the richness of the blood in fibrin or albumen, may determine the physical character of an ulcer; just as the inflammation which is an anthrax or boil at the back of the neck or axilla may be a phlegmon in the cellular tissue surrounding the knee-joint, or in certain reduced states of the system. This controversy, which appears to have been kept alive by the supposition that, if there be two poisons, the syphilitic is always attended by induration, and that, if there be but one, the so-called chancroid is as competent as any indurated sore to infect the constitution of a subject exposed by temperament or otherwise to contagion, should drop lifeless, as it seems to me, so soon as we admit the

fact that while some ulcers undoubtedly do infect and others do not, we cannot as yet distinguish in all cases which are likely so to result.

It was thought on the Idaho that the correctness of our prognosis was much better assured when the physical signs of specific induration were present than when few or no diagnostic points appeared, differentiating the sores from ordinary venereal ulcers, the so-called "chancroids." And we were disposed to think that, as experience accumulated, there became distinguishable to the touch of specific induration (whether parchment or Hunterian) a sensation which differed essentially from that afforded by the inflammatory boundary established around an ordinary innocuous sore by irritant applications. The specific induration seemed essentially more brawny and elastic, and more freely movable upon the subjacent tissue, than the inflammatory,* "giving exactly the sensation of a foreign body." Certain localities, which will be more fully described hereafter, seemed more readily to exhibit induration than others; and from this circumstance (if verified by further experience) may be deduced a valuable aid to diagnosis, since a non-indurated sore appearing on parts favorable to the production of specific deposit was far less likely to be followed by constitutional manifestations than a similar ulcer upon parts not so predisposed. During the entire two and a half years, for example, spent in Japan, I do not remember to have seen a single instance, afloat or ashore, of constitutional syphilis following a non-indurated sore in the sulcus behind the corona glandis.

PERIOD OF INCUBATION AND DIAGNOSIS.

Incubation.—The figures on this point are so defective, only eight cases being noted, as to be quite valueless as statistics. In six cases of chancroid the average incubation was reported

*Ashhurst's Surgery, page 439.

as six days, and in two cases of infecting sore, five and a half days. Diday gives fourteen days as the average incubation of twenty-nine cases of infecting chancre; Chabatier, fifteen to eighteen days in ninety cases. Clerc "insists upon the presence or absence of induration as diagnostic of the two species of primary sore, and has reported several cases of infecting chancre which were preceded by a period of incubation of thirty days;" and Bumstead* (from whom the foregoing statements are quoted) reports several instances exceeding ten days, and one well-authenticated case wherein the period of incubation was thirty-five days. †Erichsen states that the "chancrous ulcer, whatever form it assumes, seldom makes its appearance until a few days, five or six, after connection." ‡Druitt says: "The time at which venereal sores appear is usually said to be from the third to the tenth day after infection," but is disposed to accept the doctrine of Ricord, that the poison, although unseen, operates progressively from the first moment of its application. This opinion is supported by Dr. F. N. Otis,§ (professor of venereal diseases at the College of Physicians and Surgeons,) who believes that the essential *materies morbi* is a "disease-germ," such as has been described by Mr. Lionel Beale; and hence that, although quiescent perhaps at first for a "period of incubation,¶ varying in

* Bumstead on Venereal, 1861, p. 370.

† Surgery, p. 427.

‡ Surgery, p. 188.

§ On the Physiology of Venereal Infection, N. Y., F. Leypoldt, 1872, p. 18.

¶ *Op. cit.*, p. 3. Dr. Otis holds that the period of secondary incubation is merely the measure of delay met with by the diseased germs in passing through and out of the largest lymphatic gland into the general system. He holds that the poison of syphilis is broadly distinguished from that of chancroid, in that it is *per se* bland and unirritating in its nature; that it is possessed of and capable of transmitting an exaggerated vitality; that it in no way interferes with the prompt and thorough healing of the part to which it is applied; and that one of the earliest manifestations of its peculiar properties is the production of coagulation in neighboring albuminous material. Therefore, when the poison finds entrance into the system, the solution of continuity through which it entered may heal readily and entirely, and the

recorded cases from thirty-six hours to seventy-two days," it never loses its vitality, but proceeds in its course of development, producing by its presence "a coagulation of albuminous materials, a separation of the fibrinous elements of the fluids brought within its influence," which results in induration.

Ashhurst says that "this period (of incubation) has been estimated by different observers at from one to seven weeks, and it is probably safe to say that the average is from two to three weeks." This writer is of opinion that the "Hunterian chancre foretells a more severe attack, and is marked by a shorter period of incubation, than the superficial erosion."*

Gross writes: †"Without attempting to decide this question, (of incubation,) for which our data are perhaps still insufficient, it is reasonable to infer that the effects vary in different cases and under different circumstances, according to the structure of the inoculated surface, the natural susceptibility of the part, the purity and quantity of the poison, and the degree of the resulting inflammation. * * * The average period (of incubation) may be stated at from three to six days. My opinion is that the actual latency of the virus is very short, and that, like other zymotic poisons, it begins to act, although imperceptibly to us, within a very brief space after it has been inserted."

‡Niemeyer's statement is as follows: "According to the belief

"disease-germ" be for a time imprisoned by the surrounding coagulation. The *primary* incubation is the time which elapses between inoculation and the evidence of this coagulation or induration. The tendency of the vital (amœboid) movement of the disease-germ is, however, always toward a lymphatic canal, traversing which it is arrested by the first gland, and coagulation again occurs. Here fatty degeneration of the germs may occur, and the *materies morbi* be evacuted as a gelatinous deposit. More commonly, however, the germs eventually find their way, either individually or by transmission of their vital properties to neighboring bioplasts, into the general circulation, whereby the secondary manifestations of the disease appear.

*Surgery, 1871, p. 438.

†System of Surgery, vol. 1, p. 276.

‡Text-Book of Practical Medicine, New York, 1869, vol. 2, p. 668.

of all trustworthy observers, the period of incubation of the chancre virus (chancroid) is a very brief one. * * * After artificial inoculation redness appears in thirty-six hours, progressing to a vesicle on the third day, which bursts from the fifth to the eighth day." And again, as to the infecting sore, (p. 678:) "The period of incubation of the syphilitic virus is from three to four weeks." In describing the progress of the disease from inception, Niemeyer speaks of a hard nodule as the usual forerunner of the infecting sore.

The following passages are extracted from the report of the British admiralty commission, of which Mr. Skey was president: "The 'local sore' (chancroid) has generally well-defined characters. It first appears, as a pustule, from three to four days after intercourse," (p. 8.) "The syphilitic sore is seen under three forms: one characterized by induration throughout its entire course; one soft in its early stage and becoming subsequently indurated; and one soft throughout its whole course, but which, unlike the simple local sore, is followed by constitutional disease. * * * True syphilitic induration* presents

* Dr. Otis maintains that the process of gonorrhœa, chancroid, and ulceration generally are essentially processes of necrosis, destruction and exfoliation of tissue; while the syphilitic process is essentially a process of proliferation, analogous to that of cancer, whereby new tissue is formed and laid down. In illustration of this view, he has been kind enough to show me a microscopic drawing in which the discharge from the surface of an infecting sore and from an epithelioma are compared, and their striking resemblance manifested. Accepting the accuracy of Mr. Beale's researches respecting bioplasts, he thus plausibly explains the fact that the discharge from gonorrhœa and from the chancroidal sore contains but little "formed material" or epithelium, the destructive and extensive action being so rapid that germinal elements are thrown off while still in a very early stage of development. In the infecting sore, on the other hand, the tendency being formative and not destructive, the material thrown off is found to be in a high state of development, containing an abundance of fully-formed epithelial cells, (formed material.)

Relying upon this theory, he deduces a valuable means of diagnosis, when a patient presents a doubtful sore; after thoroughly cleansing the ulcers so as to remove any accidental collection from neighboring parts, he passes a

itself in three different forms, viz: 1st, in that of a cup-shaped cavity or ulcer on an indurated base; 2d, in that of a shallow abrasion or excoriation, commonly of an ash-gray or livid color, also on an indurated base; and 3d, in that of a deposit of well-defined induration beneath unbroken skin. From the former a serous ichor exudes; from the last there is no moisture, because there is no ulceration," (p. 7.) "Upon the whole, the weight of evidence greatly preponderates in favor of the view that there is no definite period of incubation, either for the infecting or the non-infecting sore, assuming the term "incubation" to imply such a uniformity as exists in the period of incubation of other specific diseases, as measles, small-pox, &c. It is nevertheless a fact that the soft sore that goes on to suppuration does make its appearance at an earlier date than the hard sore, which does not suppurate, the average period in the former case being three or four, and in the latter twelve or fourteen, days; but there is a great deviation from this average in individual cases." (Report, p. 12.)

The experience of the Idaho agrees most nearly with the last of these varying opinions, viz, that of the British admiralty commission. The Hunterian chancre was rarely met with, and in certainly a majority of cases the sores did not present characteristics which could be considered positively diagnostic. The commonest form of infecting sore was the "superficial erosion," (Niemeyer,) which, in most cases, exhibited induration within two weeks after its appearance, (mixed chancre,) and thus first gave reasonable grounds for a prognosis. The typical Hunterian chancre, the sore non-indurated throughout its course, and the induration without ulceration, were also occasionally seen, and have been already referred to. I am inclined to believe

microscope-slide over the fresh surface. If the deposit thus obtained exhibit under the microscope fully-formed epithelial scales, he at once diagnoses the infecting sore, commences treatment accordingly, and thus far, he tells me, the results have always verified his diagnosis.

also that the site of the sore determines, to a great extent, the existence and degree of induration; that an infecting sore upon the glans or prepuce, for example, will always become indurated at some period of its existence or in its cicatrix, while an equally virulent sore over the symphysis pubis, upon mucous membrane, or any other part overlying plentiful adipose tissue, may never become indurated at all. When induration appears upon an ulcer which has existed for some time, it is probable that the person from whom the disease was contracted suffered from both the infecting and non-infecting sores, each virus following the laws of its own period of incubation in the resulting lesion, and manifesting itself accordingly at different times upon infecting sores, which are so situated as not to become indurated at all; and upon most ulcers on mucous surfaces a whitish pellicle occasionally is formed simulating that observed upon ulcers in diphtheritic patients. Perhaps in certain localities true fibrin cannot be separated by the processes of the disease, an aplastic exudation of a croupous nature being substituted.

As stated above, there are no figures of statistical value relating to the period of incubation in the cases which were received on board the Idaho, this deficiency being due to the habitual vagueness of the sailor, no less than to the "proverbial mendacity" (Bumstead) of venereal patients. The averages of Mr. Skey's report (twelve to fourteen days) agree well with my recollection.

Site of the sore.—This circumstance was noted in 41 cases, 26 of which were simple and 15 infecting sores, as follows:

Simple sores.

Orifice of urethra	1
Margin of prepuce	2
Glans penis	5
Corona and furrow behind the glans	8

Beneath margin of frœnum	4
Perforating frœnum	1
Seat of operation for phimosis	1
Reflected prepuce	2
External prepuce	2
Total	26

Infecting sores.

Presenting no scar	2
Urethra	1
Glans penis	3
Corona glandis	4
Reflected prepuce, (parchment induration)	1
Near frœnum, (serpiginous chancre)	1
Pubes, (non-indurated)	2
Urethra, (admitted to Oneida's list for gonorrhœa and rheumatism)	1
Total	15

To these should be added (from private notes) one case of urethral chancre, and one in which the initial lesion was an indurated lump, resembling a grain of coffee, beneath the unbroken prepuce behind the corona, freely movable upon the subjacent tissue. In both cases the disease was contracted from the same woman, on the same night; both resulted in a regular course of constitutional symptoms terminating in recovery, and both reported on the same day, having first noticed the disease twenty-four and twenty-five days, respectively, after infection. One of these patients is since dead, by drowning, after enjoying an apparent immunity from the disease for upward of a year. The other has been occasionally heard from, and has, so far as I know, entirely recovered.

The most common situations, then, for both simple and infecting sores were the glans, the corona and furrow, and beneath the margin of the frœnum. To the two cases "presenting no scar" must be added many others not noted of constitutional disease, in which the site of the initial lesion could not be as-

certained, there being no physical evidence of its existence. I believe that there is an opinion very prevalent in the profession that some evidence, in the shape of an indurated cicatrix, of parchment induration, or of glandular induration, persists so long as the system remains infected by the disease. This opinion is undoubtedly contrary to observation. Very many cases were treated on the Idaho showing even so early secondary eruptions as roseola, while the site of the original sore could only be guessed at from the vague statements of the patient, or remained quite unascertainable.*

One case of *urethral chancre* admitted to the regular list, and two treated privately, were distinguished from gonorrhœa by the scantiness of the discharge and absence of vesical irritation, while one (from the Oneida) was erroneously entered and treated as "gonorrhœa" until the secondary eruption appeared. In such cases the existence of chancre was to be suspected when the glans was not swollen or congested, and when tenderness on pressure was confined to a single spot, especially when situated on the upper surface of the urethra, and was easily verified by the aid of an ear-speculum introduced into the meatus. As already stated, infecting sores upon the penis were generally indurated, the induration persisting longer when the sore had been situated upon the prepuce than when confined to the glans and furrow behind the corona. Often, however, this induration did not appear until some days after the ulcer, the excessive lewdness and uncleanliness of the Japanese rendering the co-existence of the simple and infecting sores more common, I fancy, than obtains elsewhere.

The site of the primary sore appears to have only this bearing upon diagnosis, viz, that no favorable prognosis should be

* In doubtful cases the surgeon in charge placed much dependence upon the induration of the supratrochlear gland of the elbow, which was often found still to remain after other proofs of the disease had disappeared.

made when an apparently non-indurated ulcer presents itself upon the skin overlying plentiful adipose tissue (or sparingly supplied with lymphatic vessels) until the lapse of at least six weeks without untoward symptoms; while, on the other hand, the prognosis of an ulcer upon the meatus, glans, or prepuce, which remains non-indurated throughout its course, may safely be affirmed to be very favorable.

Sequelæ and complications may be tabulated as follows:

Following simple sores.

None	11
Urethritis	6
Suppurating bubo	5
Non-suppurating bubo	4
Follicular ulcers	4
Gonorrhœal epididymitis	1
Division of frœnum	1
Amputation of glans	1
Phimosis	2
Operation for phimosis	1
Inflammatory induration	4
Bronchitis	1
Erroneous diagnosis	2

Following infecting sores.

General eruption	25
Nocturnal pains	23
Periostitis	15
Chronic syphilitic rheumatism	17
Gummy tumors, (muscular nodes)	2
Orchitis	3
Cervical adenitis	5
Inguinal adenitis	9
Inguinal adenitis, (syphilomatous deposit)	1
Syphilomatous degeneration of bursa, (coracoid)	1
Pleuritis	1
Thecitis	2
Marked cachexia	8

Urethritis	4
"Muscular stiffness"	1
Permanent scars of unknown eruption	3
Epididymitis	1
Onychia	1
Ulcerated nodes	2
Pharyngitis	8
Alopecia	4
Salivation	1
Secondary ulcers	4
Iritis	6
Mucous patches	2
Hemicrania	1
Balanitis	1

Of thirty cases of simple sore then, eleven were followed by no sequelæ or complications whatever, the sore progressing to cicatrization as would an ordinary ulcer or abrasion upon other parts.

Urethritis was a frequent complication, occurring in six recorded cases, besides several which did not appear upon the ship's books. In four of these recorded instances gonorrhœa did not appear until after the patient had been under treatment for chancroid for a longer or shorter time, (averaging four days,) while in two instances the gonorrhœa appeared first. When urethritis *followed* chancroid it was thought to be due to the extension of inflammation from neighboring tissue, producing catarrh of the urethra, or to accidental inoculation by the discharge from the ulcer, perhaps because of elongated prepuce. When, however, urethritis *preceded* a venereal ulcer, there was good ground for supposing a relation of cause and effect. For example, a prisoner, sent on board as such and kept closely confined in a cell, reported and was treated for gonorrhœa. During the progress of the treatment a pustule appeared behind the corona, which speedily was developed into a phage-

denic chancroid. Of course there was in this case no possibility of venereal infection otherwise than by inoculation from the gonorrhœal discharge. And on comparison of dates it appeared that the latter was probably an exacerbation of an old gleet, brought on by self-abuse. A patient at the Philadelphia Naval Hospital in 1866 contracted a gonorrhœa, the discharge from which, owing to his failure to attend to the dressings ordered, was suffered to come in contact with his scrotum during one night and part of a day. The result was extensive superficial ulceration of the scrotum, with profuse purulent discharge, simulating closely that of urethral gonorrhœa. In another case, not entered on the ship's books, a patient was recovering, after some three weeks' treatment, from an ordinary gonorrhœa, and during this time had scrupulously carried out the directions given him, not visiting the shore at all, when a papule, soon followed by others, appeared in the furrow behind the corona. These papules, supposed at first to be herpes præputialis, soon became pustular, broke, and were developed into very obstinate ulcers, presenting all the appearances of ordinary chancroids following venereal contagion. This last patient being exceedingly anxious about his case, and very cleanly in his habits, it seems scarcely possible that the sores could have resulted from any direct infection whatever. It was thought possible that the apertures of some of the urethral follicles were sealed, perhaps by the injections used in treating the gonorrhœa, thus confining the gonorrheal discharge, which eventually made its way to the surface.

Of 9 buboes but 5 proceeded to suppuration.* In five instances other sores were developed during the progress of the

* Niemeyer (vol. 2, p. 673) thinks that suppurating bubo is most likely to follow sores in the neighborhood of the frænum. In the five cases here noted, the sore was situated twice on the glans, once in the furrow behind the corona, and twice its site was not noted.

original ulcer, apparently in the preputial follicles, and therefore entered as "follicular sores."

Amputation of the glans became necessary in one case as the only means left for checking the progress of a most obstinate phagedenic ulcer. All local applications, including repeated cautery with strong nitric acid, failed in this instance, recovery following the final amputation of the remainder of the glans. Some time after the operation the prepuce, which had adhered on cicatrization closely around the meatus, was dissected back for about three-quarters of an inch, and the bottom of the wound packed with oiled lint. By this proceeding a semblance of the glans with its prepuce was produced, approximating, as time passed, to the nature and appearances of the usual pseudo-mucous membrane of the part.*

"*Inflammatory induration*," which occurred four times, was in each instance the result of the application of "bluestone," the sailor's favorite remedy in such cases.

Of seventy cases of constitutional syphilis, none were free from one or other of the sequelæ and complications named.

General eruption.—Probably few or none of the decided cases ran their course without the appearance of this sign; but as many had already passed, before admission into the hospital, into the stage which is characterized rather by "tumors throughout the connective tissue of a peculiar gummy consistence * * * (and) lesions of the viscera, with a general vitiation and degradation of the entire economy,"† than by cutaneous eruptions, it was impossible to determine accurately, at the time of taking these notes, the date or nature of such eruption

* "Now in all this gradual return of tissues to the healthy state, we may trace, I think, a visible illustration of the recovery from the minute changes of disease. In all these is a gradual approach of the new particles that are successively produced to a nearer conformity with the specific character of the parts they should replace, *till repair becomes almost reproduction.*" (Paget's Surgical Pathology, Philadelphia, 1854, p. 160.)

† Otis' Physiology of Venereal Infection, p. 4.

in more than twenty-five instances. Of these twenty-five there were—

Roseola	9
Lepra	1
Papules	2
Papules and vesicules	1
Papules from iodide of potassium	1
Pustules	3
Pityriasis and alopecia	1
White scars	5

Of course, this list is not intended to show the nature of the eruption which first appeared. In every case but one which ran its course under our observation this first eruption was roseola, appearing first upon the abdomen and then upon the thickened epidermis of the palms and soles, where it left superficial cutaneous exfoliations and livid circular stains for a long time after it had faded elsewhere. The single exception was lepra. Impetigo was also reported as having been the first eruption observed on a patient admitted from the Ashuelot. The average date of the first appearance of secondary eruptions was, as nearly as possible, six weeks after infection.*

Nocturnal pains, although so prominent as to have been noted in only 23 cases, were present in nearly all, and appeared to consist

* "The constitutional manifestations of syphilis follow the primary sore at an uncertain interval of time, ranging from four to ten weeks, the average term being about six weeks. * * * The committee have sufficient ground for expressing their opinion that the dry and painless forms of eruption, viz, psoriasis, lepra, and tubercle, but especially the two former varieties, constitute the predominant symptoms following the indurated sore, and that the remainder more commonly follow the varieties of the soft or moist sore." (Report of British Admiralty Commission, pp. 9, 10.)

"Mr. Hunter referred the varieties in the secondary appearances, or eruptive stage, to the following causes: (1) The different kinds of constitution; (2) the different kinds of solids affected; (3) the different dispositions the solids are in at the time." (Hunter's Works, edited by Palmer, vol. 2, p. 405, quoted in report, *loc. cit.*)

essentially in a neuralgia of the nerves supplying the periosteum, often quite independently of local periostitis. Its periodicity seemed to be due rather to the pressure or warmth of the bed-clothes than to be connected with the lapse of a definite interval of time. . And one of the first evidences of the constitutional operation of iodide of potassium was the amelioration of this symptom.

Periostitis, occurring in fifteen instances, was situated upon the spine of the tibia in 13 cases; left temple in 1 case; back of hand in 1 case. In three instances the nodes were old, ossified or "eburnated," and painless. In but one (situated over the spine of the tibia) did ulceration occur; but in one case ulcers of the hard palate, attended by caries, were supposed to have originated in nodes.

Chronic syphilitic rheumatism, so called, was not usually attended by serous effusion into the joints. When such effusion did occur, it was rather to be attributed to the exceeding dampness of the climate, aggravated by residence on shipboard, which produced a strong tendency to inflammatory rheumatism, than to the poison of syphilis. When not dependent upon idiopathic rheumatism as a complication, syphilitic rheumatism was characterized by stiffness and dryness of the joints, by soreness of the muscles during contraction, and by general pains, not easily localized, attending every effort at motion. The ankle and wrist joints, with the tarsal and lumbo-sacral articulations, suffered more frequently than the knee, elbow, hip, or shoulder. Effusion did often occur in the loose tissue around the ankle-joint, apparently anasarcous, and due to spanæmia and deficiency of vascular tone in a dependent part distant from the center of circulation. In one very severe and tedious case, chronic rheumatism, together with constitutional syphilis, produced most deplorable results. Onychia, enlargement of the joints, contraction of the fingers and toes, dyspepsia, and absolute

bed-ridden helplessness followed, in spite of constant care and energetic tonic treatment.*

Gummy tumors, (muscular nodes.)—The two cases seen presented this sign in the muscular tissue near the elbow.

Cervical adenitis (five cases) appeared in the "gummy" stage of the disease, the glands enlarging without vascular excitement, remaining indolent until artificially opened, and requiring local stimulation, after evacuation of their mucilaginous contents, before any effort to repair became manifest.

Of ten cases of *inguinal adenitis*, only one, occurring late in the progress of the disease, exhibited syphilomatous (gummy) degeneration.

The two cases of *thecitis* were rather instances of syphilomatous deposit within the sheaths of the tendons than of any true inflammation. The result was a stiffness in the motion of the tendon, approaching immobility, with an enlargement of its sheath, soft and pultaceous under pressure.

Marked cachexia I find noted in only eight cases, although pallor and adynamia were, according to my recollection, the most constant attendants of the disease.

The four cases of *urethritis* all followed and were attributed to the administration of iodide of potassium, being accompanied by catarrh of other mucous surfaces, dyspepsia, anorexia, and, in one instance, a papular eruption.

Pharyngitis, although generally considered as common an early secondary manifestation as roseola, I find noted only eight times, a fact which must probably be attributed to the defective previous medical history of many of the admissions.

Salivation existed in one case upon admission. Mercury was never pushed to this extreme on board the Idaho.

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* It was often observed that the pains simulating rheumatism, as well as those recurring at night, were sensibly relieved during the re-appearances of an eruption.

Secondary ulcers include one case of condylomata near the anus, and the term refers in general to the deep ulcerations which occasionally occurred upon the dorsum of the foot, or at other points distant from the center of circulation, during advanced stages of the disease. None of these ulcers were attributable to pre-existing nodes.

It is somewhat remarkable that rupia, a frequent sequela among the natives on shore, failed to appear in any of our patients. *Iritis*, also common in Japan, occurred but six times, two being re-admissions of the same patient, and two of those affected brothers.

One patient suffering from nodes, cachexia, and osteocopic pains contracted a chancroid, which resulted in suppurating bubo, illustrating well the essential difference in the two forms of disease. No perceptible effect was produced upon the constitutional disease.

Similar sequelæ often occurred at about the same time. For example, at one time (summer of 1868) many persons suffered together from rheumatic complications.* At another, (summer of 1869,) ulcers and buboes which had been opened exhibited an obstinate tendency toward phagedæna, a circumstance attributed by the surgeon in charge to the foul condition of the ship's bilge. A patient was admitted from the Monocacy far gone in constitutional symptoms, (tibial periostitis, gummy deposits, &c.,) and seemed to recover entirely after two hundred and eleven days' treatment. Eight months afterward, having been constantly on duty during the interval, he was returned, suffering from pleuritis and lepra, followed by apparently complete recovery in fourteen days. There was no subsequent relapse, so far as I could ascertain. Now, I am inclined to believe, considering the brief duration and prompt recovery from this re-

* From June 20 to August 9 of this year, there were but seven days without rain.

lapse, that it would not have occurred at all had not an intercurrent exhausting inflammation reduced the system to a condition so feeble as to fall within the power, so to speak, of the diathesis still lurking in the blood.* It seems not unreasonable, indeed, to attribute to external conditions a considerable power for modifying and even determining the form of secondary eruptions according to circumstances. The case referred to by Bumstead, of a noted prize-fighter who enjoyed perfect immunity until he went into training or fell ill, and at such times suffered from a recurrence of syphilitic symptoms, is in point.

Results.—Sixteen cases of constitutional syphilis recovered entirely, so far as could be ascertained; thirty-two were entered as "relieved," including all those who showed any evidence whatever of disease, such as eburnated nodes, discoloration of iris, enlargement of testis, &c., and including also those cases which were supposed, when discharged, to have recovered, but which afterward suffered one or more relapses; four were discharged from the service or sent home for further hospital treatment, and eighteen still remained on the list when the hospital was closed, of whom many had been condemned by medical survey as unfit for further service.

Of cases entered as "simple sore," twenty-seven recovered, and four still remained on the list at the time of closing the hospital. Three supposed chancroids afterward turned out to be infecting sores, of which one recovered, one was "relieved," and one discharged from service.

Duration.—The number of days lost was as follows:

Simple sores.

27 cases which recovered lost	743 days;	average per man	27.52
4 cases remaining on the list lost	217 days;	average per man	53.50
31 cases. Total loss	960 days;	average per man	30.97

* *Vide* notes to page 523, *ante*.

Constitutional syphilis.

16 cases which recovered lost.....	588 days; average per man.	36.75
32 cases relieved lost.....	1,442 days; average per man.	45.06
4 cases discharged and sent home lost	394 days; average per man.	98.50
18 cases still on list lost.....	314 days; average per man.	17.44
70 cases. Total loss	2,738 days; general average.	39.11

The average duration of chancroid is increased by one tedious case resulting in amputation of the glans penis, which was under treatment for 136 days. Rejecting this case, we have as the average duration of simple sore 23.34 days, which nearly approaches the true average. So, also, the sum of days lost by those cases of chancroid still "remaining on the list" is increased by one case complicated with chronic bronchitis, which had persisted 126 days.

The average duration of constitutional syphilis is much greater than is indicated by the list of recoveries, since many of those same cases had already been admitted one or more times, such previous admissions being entered as relieved. The figures under this head (relieved) represent very fairly the average duration of a single attack or exacerbation of the disease, during which the patient was incapacitated from duty. Often long intervals would elapse between such exacerbations, during which the patient would be on duty and, apparently, in perfect health. The return of the disease was usually determined by conditions unfavorable to the health in other respects. When on light duty, or otherwise protected from unusual exposure or hardship, syphilitic patients would often enjoy immunity from manifestations of disease for an indefinite period. When discharged from the sick-list (otherwise than by transfer to the United States) these patients, now entered as "relieved," were always, for the time being, entirely free from evidence of disease, and it was not often possible to distinguish cases which were likely to suf-

fer relapse from those definitely cured. The general average, then, calculated from the total number of days lost, represents only the average duration of a single admission for constitutional syphilis, reckoned from the time of admission to the Idaho's list to the time when all evidence of disease had for the moment disappeared.

In illustration of the very long period during which syphilis sometimes remains in abeyance may be cited the case of a man, aged about 45, who was admitted October 6, 1868, suffering from general deeply-seated pains, ulcers of shin and dorsum of right foot. He stated that he had also suffered from pharyngitis and alopecia. After unusually protracted treatment, lasting one hundred and eighty-nine days, he was discharged, as having "partially recovered"—that is to say, with impairment of his general health, a tendency to rheumatism, and ill-conditioned scars where the ulcers had been. The total duration of his disease, from its inception on board the Iroquois to the date of his discharge, was two hundred and forty-three days. His health improved while on light duty, and he served out his term without further trouble. After some six months' residence on shore he passed the usual physical examination, and was reshipped as a sound man; but, being in time sent back (from San Francisco) to the Asiatic squadron, suffered from a relapse of his old disease, and I met him in July, 1872, over three years after his discharge from the Idaho's list, at the New York Hospital, where he was undergoing treatment for "syphilitic cachexia." There appears to have been in this case a period of nearly two years' absolute immunity from any manifestation of disease.

TREATMENT.

Of the simple sore.

"It is very doubtful whether mercury exercises any influence on the purely ulcerative action of primary sores. * * * *

Treatment by mercury should be reserved for the prospective constitutional disease should it present itself hereafter, because the balance of evidence warrants the belief that at this stage of the disease mercurial action cannot avert the occurrence of secondary or constitutional disease. Mercury will neither arrest the progress of glandular enlargement nor prevent suppuration."*

"The alternative to the employment of mercury consists in simple local treatment, the avoidance of local irritants, whether medical or mechanical, attention to cleanliness, and to the improvement of the general health."†

The practice on the hospital-ship agreed well with these opinions, and mercury was never employed in the treatment of simple sores, except, in the form of calomel or red precipitate, as a local dressing. If the patient was in robust health, and the sore presented no evidence of a tendency to phagedæna, it was touched with nitrate of silver, a simple dressing of powdered carbonate of zinc, lint saturated with dilute carbolic acid or black-wash, or a solution of the potassio-tartrate of iron was applied, and the patient kept on the sick-list until the ulcer had progressed well toward cicatrization; the dressing being frequently changed and scrupulous cleanliness enforced during this time. If, however, as was more commonly the case, the patient appeared to be anæmic, and the sore presented an indolent appearance, with a tendency to extension, he was entered on the "special-diet" list, and was ordered tonics and, when necessary, stimulants; the following prescription (from Bumstead) being a favorite and generally attended by success:

‡ ℞. Ferri et potassæ tartratis, ℥ss
Aquæ camphoræ,
Syrupi simplicis, āā, f℥iij
Misce.

S. Two teaspoonfuls three times a day.

* Report of British Admiralty Commission, p. 16. † *Op. cit.*, p. 17.

‡ "Ricord calls this preparation the 'born enemy' of phagedæna, and at-

Serpiginous, perforating, extremely indolent, and phagedenic sores were freely cauterized with strong nitric acid, and the operation repeated until a healthy surface had been reached. In short, the chancroid was treated in all respects as a sore of the same gravity would have been if situated elsewhere or due to other causes; such constitutional treatment as was pursued regarding solely the general health of the patient.

Of the sequelæ of the chancroid.

Urethritis, occurring as a complication, was treated in the same way as simple gonorrhœa, and was considered a peremptory indication for supporting measures, extra diet, and perfect rest in bed.

Buboes were regularly painted with iodine *secundum artem*, without, so far as I can remember, any beneficial result whatever. Graduated pressure sometimes proved effectual in preventing suppuration.* Blisters were tried, but not to the extent recommended by Niemeyer,† which may account for their inefficiency in our hands. As soon as a bubo showed fluctuation it was freely opened and its contents evacuated, packed with lint soaked in carbolic acid, or smeared with the red-precipitate ointment, and, when a tendency to healing appeared, dressed with a spica and compress so graduated as to apply greater pressure at the margins than over the center. When it seemed important to avoid leaving a scar (as with married men) a seton was applied; the results of this procedure being

tributes to it an almost specific influence upon ulcerative action. I can add my own testimony to that of Ricord and many other surgeons in its favor, and would strongly recommend a trial of it in the class of cases under consideration." (Bumstead, *op. cit.*, p. 404.)

* Assistant Surgeon T. H. Streets, United States Navy, tells me of a method of applying pressure, which has certainly the merit of simplicity and convenience. The patient is put in bed and half a brick tied over the tumor, exercising pressure by weight only. The results have been exceedingly favorable.

† He recommends rubbing with caustic potassa or *repeated* vesication. As to such cases he says: "In none of the cases thus treated by me have any sinuses or fistulæ formed." Vol. II, page 675.

far more favorable than Bumstead's brief dismissal of it would lead one to expect.* A long, straight needle, triangular near its point, and armed with three or four thicknesses of saddler's silk, was pushed through the base of the tumor, in a line with Poupart's ligament, as soon as fluctuation was distinctly recognized. The ends being then tied together, the patient was instructed to draw the thread backward and forward through the tumor every three or four hours. Usually a gush of pus followed each movement of the thread, diminishing in quantity in about four days, after which the thread was cut and withdrawn and a graduated compress applied, so as to exercise pressure over the center of the tumor. The usual result was a speedy healing, leaving no other scar than the marks of the entrance and exit of the needle. I saw this method of treatment followed with good success in the Army during the war, have frequently employed it in practice since, and can bear witness to its efficacy as a prompt and generally effectual procedure, rarely followed by sinuses or fistulæ. There were no instances of very severe sloughing following chancroidal buboes.

Follicular sores were essentially chancroids, and treated as such.

Division of the frænum was performed but once, when the ulcer had completely perforated this process, and interfered with the application of the dressings.

Phimosis, when not congenital, was caused by inflammatory deposits in the cellular tissue, and relieved by the application of mercurial unguents. In the congenital case operated upon, the meatus not being visible, the existence of chancroid was not clearly made out until after the operation, a profuse purulent discharge from an ulcer on the glans closely simulating gonorrhœa.

* "A filiform seton, recommended by Bonnafont, and also by Mr. Parker, was reported against by a committee of the Soc. de Med. de Paris in 1859." (*Op. cit.*, p. 446.)

Of the primary infecting sore.

If authorities agree in the main as to the inutility of a mercurial course in the treatment of the chancroid, nearly all acknowledge its value in treating the infecting sore, the dispute here existing only as to the mode and time of its administration.

Among those who advocate mercury before the appearance of constitutional manifestations are to be found so high authorities as the British admiralty commission, Bumstead, Niemeyer, Ricord, and Gross. But it is to be noted that Bumstead tempers his advocacy by "two golden rules" for its administration:*

"1. Never give mercury unless the disease be clearly syphilitic, except in a few doubtful cases for experiment.

"2. Avoid the use of mercury in subjects already depressed; and in all cases suspend the treatment the moment the general health appears to suffer."

And in the American Practitioner for September 18, 1871, while still advocating the use of mercury as a general rule, he gives as the result of his further experience the following statement: "Experience shows that even in well-marked cases of true chancre it is better to defer the administration of mercury until secondary symptoms appear."†

The British commission qualifies its advice as follows: "It is generally admitted that treatment by the agency of mercury is not indispensable to recovery, and that in many cases the disease will die out spontaneously at a longer or shorter interval of time; and again, it is a fact well worthy of remark that syphilis, in both primary and constitutional forms, may make its appearance in an individual while under salivation by mercury."‡

* *Op. cit.*, p. 517.

† American Journal of Medical Sciences for October, 1871, p. 579.

‡ Report, p. 18.

Niemeyer writes: "I am well aware that the induration is capable of disappearing without their use, (mercurials,) and that this treatment affords no guarantee against the appearance of consecutive symptoms; but the indisputable fact, that the secondary symptoms are fewer and later in appearing when treated by mercury than when treated without it, induces me to prefer the former to the latter."* And Ricord, while disagreeing, recognizes the opposite view to his own: "There was one point upon which there was some difference of opinion; many believed that it was impossible to prevent the accession of secondary symptoms, the *first manifestation* of constitutional disease; many thought that, no matter what treatment was employed, the sequelæ would appear."†

On board the hospital-ship Idaho mercury was not used at all until a secondary eruption had appeared, and this mode of proceeding commended itself by the results. It appears by the above citations that mercury is to be used only when the diagnosis is absolute, and when the patient is robust; that even then, while it may delay and modify, it will not prevent, the appearance of constitutional disease, and that of those cases treated without mercury many progress to quite as favorable a termination as follows its use.‡ Considering the frequent impossibility of an absolute diagnosis, and the fact that most, if not all, syphilitic patients suffer eventually from marked anæmia,

* *Op. cit.*, p. 696. * * * "Bärensprung does not hesitate to declare a patient *treated without mercury* to be safe and permanently cured, who continues free from constitutional symptoms three months after treatment has been discontinued," (p. 673.)

† Report of August, 1872, meeting of British Medical Association, (Ricord being present,) Lancet, (American reprint,) November, 1872, p. 612.

‡ Similarly most lecturers on the practice of medicine recommend bleeding as a remedy for acute pneumonia, but the advice is so hedged in by conditions and restrictions, that I will venture to say that few practitioners at the present day meet with patients sufficiently plethoric and exhibiting that fullness of pulse, &c., which would justify to them the use of this heroic remedy.

for which a mercurial course is but a poor preparation, each case of chancre, whatever the opinion as to its real nature, was held *sub judice* until the appearance of secondary manifestations had demonstrated beyond a doubt the disease that we had to deal with.

When a man reported with a sore or induration upon the genitals, the practice was to enter his name upon the sick-list, to treat the ulcer locally, paying close attention to the general condition of his health, and to enter his name also upon a list hanging in the dispensary, with the date of his reporting, and the date six weeks afterward. When the ulcer had sufficiently healed he was discharged to duty, and recalled for examination daily, after the expiration of the six weeks, until all danger was supposed to have passed. When the sore was markedly indurated, or when only a lump of induration presented itself, it was thought to be good practice to destroy the indurated portion, in order to expedite the processes of healing, but not under the supposition that the secondary symptoms would be averted.

OF THE SEQUELÆ OF THE PRIMARY SORE.

General eruption.—The first to appear was almost invariably roseola, manifesting itself first upon the abdomen and spreading thence upward, affecting most permanently the palms of the hands. When this or other eruption had made its appearance the patient was taken off duty, placed again upon the sick-list, and immediately subjected to mercurial treatment. The following was a favorite prescription, (Bumstead, p. 503:)

℞. Hydrargyri bichloridi, gr. ij
Potassii iodidi, ʒss
Aquæ camphoræ, f℥viij
Misce.
S. Dessertspoonful an hour after each meal.

This freshly-formed biniodide produced less digestive disorder in our practice than either the bichloride or protochloride,

and never resulted in salivation. Blue-pill was not used at all. The patient was at the same time given extra diet, special attention was paid to his clothing and cleanliness, and, as a rule, iron, with tonics, and occasionally stimulants were also administered. It was remarkable how speedily, under such treatment, a roseola would fade away. Pharyngitis was not found to contraindicate such use of mercury, but the presence of a pustular eruption was.* The mercurial treatment was continued for some time after the disappearance of the eruption, but never pushed to the extreme of salivation.

Eruptions occurring later in the disease were greatly benefited by fumigation, for which purpose calomel and an extemporaneous apparatus were employed until the winter of 1869, when Surgeon Gihon procured the construction of a frame covered with canvas, within which the patient was inclosed as in a box. While applying fumigation mercury was not administered internally, but the patient was caused to inhale the fumes of the vaporized drug to as great an extent as possible. Calomel was the form employed, because of the suffocating nature of the fumes of the otherwise to be preferred cinnabar.

Nocturnal pains and "syphilitic" rheumatism were thought to indicate the use of iodide of potassium, which was employed (in occasional alternation with mercury) as the general treatment in all the forms of later manifestations. An interesting circumstance in this connection is the fact that much larger doses of this drug were required to produce the desired effect than are usually recommended in the books. Our practice was to begin with ten grains, and increase the dose gradually until improvement became manifest. About twenty grains, three times a day, was the amount usually required, the effect of the

* "It is prominently in evidence, and is confirmed by the experience of the committee, that the treatment by mercury is rarely expedient in any form of constitutional disease (syphilis) accompanied by pustular and rupial eruptions." (Report of British Admiralty Commission, p. 19.)

increased dose becoming often strikingly apparent after quite negative results from the smaller quantities. Most of our stock of the iodide was purchased at Shanghai, was of English manufacture, and contained about 1 per cent. of free iodine. To that imported from America it was found to be advantageous to add about this proportion of iodine. Intolerance and iodism were rare, and, when encountered, usually successfully met by combining the drug with Huxham's tincture, serpentaria, cod-liver oil and whisky, or other tonic. Urethritis of a mild type followed in four instances. In one quite anomalous case, that of a Chinaman, iodide of potassium produced severe salivation. The patient reported having been salivated by mercury seven months before.

Periostitis, a frequent sequela, was treated in general by iodide of potassium, alternating occasionally with a short course of mercury. Tincture of iodine, found so useless for aborting buboes, here proved often beneficial. But two cases proceeded to ulceration, being then treated with tonics and moderate stimulation, with, of course, local applications.

Other sequelæ belonging to the later stages of syphilitic disease called for such modifications as were naturally suggested by the circumstances. The general outline of treatment for constitutional syphilis may be thus expressed: 1. For the primary sore, local and expectant treatment; 2. For secondary eruptions, mercury, in such form as seemed best suited to the individual case, both internally and by fumigation; 3. For later manifestations of the disease, iodide of potassium in large doses, combined with tonics; 4. Throughout the disease close attention to diet, clothing, and hygiene. Such measure of success as followed was thought to be very largely due to the establishment of the special-diet mess on board, and to the liberal supply of hospital comforts provided by the Department. Neither sarsaparilla, guaiacum, nor mercurial inunction were

employed otherwise than as adjuncts to other modes of procedure.

Syphilization was often discussed but never tried, for obvious reasons. Professor Boeck, of Christiania, was examined before the British commission, as were many others, experts, who had followed in his footsteps, and one of his patients. The result of these examinations is embodied in the following expression of opinion:

"Although they (the committee) have reason to believe it may prove serviceable in such chronic cases as have failed to yield to more ordinary treatment, they have no sufficient evidence of its curative properties to outweigh the obvious objections to its general employment; and even accepting the entire truth of the reports of its curative powers, the treatment is repugnant to the habits and feelings of the profession in this country, and, in the majority of cases, is slow of operation."* Dr. J. C. Hutchinson, of Brooklyn, read a paper before the Kings County Medical Society, March 19, 1872, which I had the privilege of hearing, detailing the results of Professor Boeck's treatment of three patients at the Brooklyn City Hospital, during his visit to this country in 1869. The first case was of three years' standing, was far gone in the disease when the treatment was commenced, and had been mercurialized, (a circumstance considered by Professor Boeck to be especially unfavorable to treatment by inoculation.) The inoculations proved generally unsuccessful, and the patient died in nine months after the treatment had been begun, having experienced, however, temporary amendment at the commencement. The second case, undertaken at an earlier stage, was discharged, well, eight months after the treatment had been begun. The third had had chancre, alopecia of eyebrows, nodes, and nocturnal pains, but no eruption or persistent sore throat. Inocula-

* Report, p. 20.

tion was begun when the disease was of two years' standing, and the patient discharged well in five months. It should be noted that these three cases were all exceedingly unfavorable, "Professor Henry having declared them the most unpromising he ever saw." To hopeless cases like these Dr. Boeck confines his recommendation of this method of treatment.

GENERAL OBSERVATIONS.

Beyond a rather exceptional virulence, syphilis, as observed on board the Idaho in Japan, presented no features which have not elsewhere been observed and recorded. We were inclined to consider its type as more *acute* than usually observed, and that, like most acute diseases, it exhibited a tendency to self-limitation when the patients were placed under favorable conditions. In treatment, much greater reliance was placed upon hygienic measures, including rest, diet, and clothing, and upon constant observation, than upon the so-called specific modes of medication, although these latter were by no means neglected; and it was thought that the results justified such action. In confirmation of the opinion that the disease showed a tendency to self-limitation, it may be mentioned that, so far as I could learn, but one death occurred during the two years and a half I spent in Japan, (including cases occurring on shore and on other ships,) which was directly traceable to this disease. The complete recoveries, especially when only those cases subjected to early hospital-treatment are considered, compare favorably with similar statistics elsewhere.

But one case of congenital syphilis was observed, the evidences consisting in the incurvation and lunated margins of the incisors, extreme mental sluggishness, and very obstinate interstitial keratitis. The patient, rated as a first-class boy, belonged to the Idaho's crew, and spent the last two years of my connection with the ship on duty, although suffering from

albugo corneæ and dense stupidity, in apparently perfect physical health.

The cases herein considered furnish no evidence whatever as to the contagiousness of any secondary lesions.

DISEASES CLASSED AS GONORRHŒA.

Period of incubation was noted in ten instances, the average of which was 4.4 days. Bumstead says: "The symptoms of urethral gonorrhœa in the male appear, as a rule, from the second to the fifth day" after exposure.* The longest period noted on the Idaho was seven, and the shortest, three days.

Sequelæ, complications, &c. — The sixty-one cases observed were divided as follows:

No sequelæ or complications	14
Epididymitis	8
Gleet	9
Suppurating bubo	5
Non-suppurating bubo	2
Stricture, (1 multiple)	4
Rheumatism	5
Syphilis	5
Paraphimosis	3
Phimosis	1
Chancroid	3
Sciatica	2
Rheumatic ophthalmia	1
Neuralgia of cord	1
Bubon d'emblée	4

In fourteen cases, all but one of which were admitted from the Idaho, and subjected to treatment from the beginning, there were no sequelæ or complications, the disease running its course to recovery without check or hinderance.

Epididymitis.—Of the eight cases presenting this complication, three suffered on the right side and five on the left; three

* *Op. cit.*, p. 41.

were re-admissions, having been treated previously for gonorrhœa, four were admitted for epididymitis alone, the original gonorrhœa having occurred elsewhere, and in one case the disease occurred while the patient was on the list. One was a case of chronic syphilis, the subject of which had contracted gonorrhœa as an intercurrent affection, and one was a prisoner, not known to have gonorrhœa at all. In three cases induration of the globus minor persisted after recovery. The frequency with which patients who had suffered from gonorrhœa long before admission reported previous epididymitis led us to believe this complication unusually frequent in Japan. A similar opinion obtained among physicians on shore.

Gleet.—Of nine cases of gleet, five were so affected when admitted, and four suffered from it after treatment in the hospital. These four were all re-admissions, and the return of the discharge was in every case traceable to fatigue and exposure to inclement weather, either on duty or during liberty on shore. The frequent cases in which the ordinary urethral discharge proved obstinate and assumed a gleety form before entirely disappearing are not entered as gleet in this report. Neither are the cases of stricture so entered, although in every instance attended by a slight excess of urethral secretion.

Buboes, occurring after gonorrhœa, proved much more likely to suppurate than those following the simple sore. Similar measures to those previously detailed at length (see page 531) were adopted in these cases, but without success in more than one instance. Of the two which failed to suppurate, one proved not to be gonorrheal, roseola appearing after fifteen days. The other patient, also, afterward contracted syphilis, but there was no evidence of this disease while he was under treatment fo. gonorrhœa.

Rheumatism.—The excessive dampness of the Japanese climate predisposed all patients to this disease, and it is therefore

difficult to define accurately the connection between it and antecedent gonorrhœa, in the five cases noted. Two were re-admitted after having been treated for gonorrhœa and discharged to duty, one case being complicated with sciatica; and three were first admitted for rheumatism, the original gonorrhœa not having been reported, one being received from the Ashuelot with this diagnosis. In two cases the joints affected were not noted; in one the left elbow and ankle suffered; in one the right thigh; and in one (complicated with ophthalmia) both knees and wrists. In this last case the re-appearance of a urethral discharge accompanied the subsidence of rheumatic symptoms.

Stricture did not occur as a sequela of any case treated from its inception on the hospital-ship. The four cases noted were all admitted from other ships, and were of long standing. In none were the patients long disabled from duty. Many others presented themselves and were treated, but were not entered upon the hospital-books because not relieved from duty. But one presented more than a single stricture.

Syphilis existed as a complication in five cases. In one there was no gonorrhœa, a urethral chancre simulating this disease. Three cases which had been under treatment for syphilis and were temporarily on duty contracted gonorrhœa while on shore, and once (here noted) urethritis was traced to iodide of potassium, although at first supposed to be due to venereal infection.

Paraphimosis occurred because of œdema of the glans and prepuce, and in one case it became necessary to operate.

Phimosis.—The single instance was congenital and led to erroneous diagnosis, masking the urethral chancre already referred to until relieved by operation.

Chancroid, although a frequent complication of cases not entered upon the ship's list, is noted but three times. One case

appeared after eleven days' treatment, one after fourteen days, and the third existed at the time of admission. In two instances it was situated near, once perforating, the frænum. In all it was thought to be an indirect consequence of the gonorrhœa, and not due directly to venereal contagion.

Sciatica once accompanied rheumatism and once appeared as the only complication.

Ophthalmia.—Purulent ophthalmia did not occur at all; the single case observed accompanying rheumatism, affecting the iris and the straight vessels beneath the sclerotica, and subsiding, with the rheumatism, on the re-appearance of a urethral discharge.

Neuralgia of the cord occurred in one instance here noted, and in five not entered upon the ship's books. In two cases it preceded epididymitis.

Bubon d'emblée was noted four times in the Journal of Practice and twice in private memoranda, the latter not being cases of enlisted men. Perhaps this affection should more properly have been considered under the head of "chancroid," since in published descriptions it has been more frequently attributed to that form of venereal contagion than to gonorrhœa.

The use of the term at all seems to demand some defense and explanation, the possibility of its occurrence having been denied on high authority.* The patients were all, as it happened, respectable men, not likely to falsify the facts. In the first two cases noted, glands in the right and left groins, respectively, swelled, suppurated, and sloughed extensively, there being no physical evidence of venereal contagion, neither urethral discharge nor sign of a chancroid. In the third case, glands in the right groin had been enlarged, tender, and fluctuating for

* "But I have seen no reason whatever to believe that these cases (of bubon d'emblée) were in any way connected with either species of chancrous virus, and I regard Diday's theory to account for their origin as fanciful and untenable." (Bumstead, *op. cit.*, p. 439.)

nearly two months without any knowledge on the part of the patient of venereal inoculation, while in the fourth case a tumor appeared in the left groin, exactly over the external abdominal ring, extending thence to the femoral ring, the cellular tissue being extensively involved, followed by sloughing phagedæna, which proved exceedingly intractable. Three of these patients, and the two entered only in private memoranda, reported as soon as the tumor was observed; all readily admitted venereal exposure, but in none was there the least evidence upon the penis of local disease. As to the first case, it was noted that "the post-coronal mucous membrane was red and swollen," and one of the outside cases reported a similar condition of the same parts. It is somewhat curious that all these cases (the only ones observed during two years and a half) reported within three months, toward the end of 1868.

As to the *possibility* of such a mode of contagion, I can quote so high pathological authority as Mr. Paget, who lately said, in a lecture on "dissection-wounds," describing his own experience of poisoning, (from a subject dead after pleuritis:) "Whatever the virus was, it soaked through my skin; I had no wound or crack of any kind. * * * This absorption is generally spoken of as a strange and rare fact. Rare it may be, but strange it is not, for thus it is that *most commonly the poison of chancre passes through skin, and that of gonorrhœa through mucous membrane*, and thus that the irritant matter of cantharides and other skin-irritants passes to the cutis, and from it may be absorbed."* The lecturer then went on to state his opinion, that not only are some men constitutionally exempt from the liability to this and other poisons, and the same man free at one time and predisposed at another, but that long custom and use in dissecting predisposes a condition of exemption from dissecting-wound virus similar to that of the arsenic-eating peas-

* Lancet, (Am. reprint,) September, 1871, p. 460.

ants of Styria. He had long been out of the practice of dissecting; hence his liability had returned, and the result was a three months' illness.

Similarly, it was sometimes remarked that the older residents of Japan were less liable than new-comers, not only to syphilis (which might be accounted for on the theory of protection by previous infection) but to gonorrhœa and chancroid. It would hardly be safe to assert that these burned children dreaded the fire to the extent of complete and habitual avoidance, and possibly Mr. Paget's theory of immunity following frequent exposure may apply to these cases not less than to dissectors.

I have no doubt in my own mind that the six cases referred to were actual instances of the absorption of chancroidal or gonorrheal discharges through unbroken skin, producing suppuration in the nearest lymphatic glands. Indeed, there appears to be no valid reason for supposing the gonorrheal or chancroidal discharge less susceptible to absorption by the thin covering of the glans than mercury, for example, applied to the arm-pits or belladonna over the eyebrows.

RESULTS.

Sixty-one cases resulted as follows:

Recovered	44
Relieved	13
Recovered, but with induration of globus minor	3
Still on the list when hospital was closed	1
Total	61

Those noted as having recovered were discharged to duty to all appearance in perfectly sound health. When any evidence of disease still remained, although the patients were in all other respects fit for duty, they are entered as "relieved." The thirteen so noted include four suffering from stricture, which had

been dilated sufficiently to permit their return to duty, but which still existed and was likely to give trouble again. In five instances slight excess of urethral secretion persisted in spite of treatment; in two sciatica had not entirely disappeared, and in two stiffness of the elbow-joint persisted after rheumatism had been otherwise relieved.

DURATION.

The fourteen cases which ran their course without complications were under treatment 244 days, giving an average loss of service per man of about 17.43 days. In five of these cases the total duration of the disease (including the period which had elapsed previous to reporting) was ascertained, and showed an average per man of 28.2 days. This average represents very fairly the ordinary duration of uncomplicated gonorrhœa when subjected early to hospital treatment.

TREATMENT.

A patient reporting himself at sick-call with an ordinary gonorrhœa in its acute stage was at once relieved from duty and put to bed, his clothes being taken away and locked up. His name was entered upon the diet-list for "half-diet," usually an active cathartic administered, and copaiba ordered as soon as the purgative had operated. The "Lafayette mixture" proved an agreeable form to most patients. Occasionally, however, an unusual dislike for the drug existed, when it was given in the form of pills rubbed up with carbonate of magnesia. Beyond an occasional laxative, when required, nothing further was done until the decline of the acute stage. The cessation of scalding during micturition indicated injections, which were employed frequently at regular intervals, and very dilute. Of sulphate of zinc, 1 grain to 3 fluid ounces of water, was found to be quite strong enough to begin with, being supplemented

by frequent injections of simple cold water. This part of the treatment was not intrusted to the patients, but was carried out by the attendants. The strength of the injection was increased as the discharge abated, rarely, however, exceeding one grain to the fluid ounce. Nitrate of silver, acetate of lead, and sulphate of zinc, red wine and tannin, subnitrate of bismuth and glycerine, (Ricord,) and various other forms of injection were occasionally used, but were not thought to possess any advantages over the sulphate of zinc alone. The acute stage, during which copaiba was administered, usually lasted about ten days. After commencing injections the purulent discharge generally disappeared almost entirely in three or four days more, the remainder of the time on the list being occupied by the treatment of the thin, scanty discharge which was so likely to become chronic gleet. In ordinary cases this discharge was often checked by the administration of tinct. cantharidis with tinct. ferri chloridi, (Bumstead, *op. cit.*, p. 90.) A blister applied to the body of the penis, and removed before vesication occurred, proved sometimes efficient, a very extensive but superficial bleb appearing in about four hours after a sweet-oil dressing had been applied. If the patient had suffered from previous attacks, a stricture of large caliber was likely to be found on passing the bougie, provided the bougie were large enough.* No. 12 sometimes proved insufficient for the detection of such strictures, just behind which were the ulcers which kept the gleet alive. In such cases the patients were often sent to duty and treated off the list. Daily passage of the bougie, sometimes medicated, with occasional courses of deep injections, generally proved efficient in time. The pain of chordee (which rarely occurred when the treatment was begun early) was relieved by

* *Vide* Dr. Otis' interesting essay "On Strictures of the Urethra of Extreme Caliber," (New York, F. Leypoldt, 1872,) for an able exposition of the causes of gleet, and description o an instrument for their permanent cure.

bathing the penis in very hot water just before bed-time, applying an ointment of belladonna and mercury along its under surface, and bandaging the penis (with its dressings) up against the abdomen. A suspensory bandage was applied as soon as the patient was allowed to leave his bed, and directed to be worn for about two weeks after his discharge from the list. Epididymitis occurred only in cases where this precaution had been neglected.

Epididymitis, on account of the severe pain attending it, was very likely to be reported early in its course. The patient, if not already under treatment, was put to bed on his back, his scrotum elevated upon a wad of oakum, and a cooling-lotion applied, in combination with laudanum, if the pain were very acute. The bowels having been freely opened, a powder containing $\frac{1}{6}$ gr. of tartar-emetic, in combination with calomel and nitrate of potash, was given about an hour before each meal. It is so difficult on shipboard to prevent men from surreptitiously supplying their messmates on the list with forbidden diet, that the artificial production of anorexia at meal-times in this manner proved often a most valuable antiphlogistic measure. When the tension of the inflamed part had subsided the testicle was strapped, supported by a suspensory bandage, and the patient allowed to sit up. Occasionally it became necessary to leech the perineum, or (an equally efficient measure) open one or two of the scrotal veins in warm water. The native leech, caught by the apothecary on shore, proved quite as efficient as the European, and rather more voracious.* The average duration of eight cases thus treated was twenty-five days. Omitting one extreme case, (lasting sixty-three days,) the average becomes about eighteen and one-tenth days.

Buboes, following gonorrhœa, were treated precisely as described under the heading "Chancroid," (see page 531.)

* There is a curious resemblance between the Japanese word for leech, "hiru," and the Latin "hirudo."

Gonorrheal rheumatism called for no special treatment other than that employed in the idiopathic disease. It was noticed in two instances that the rheumatic symptoms abated coincidently with the return of urethral discharge.

Sciatica was temporarily relieved by hypodermic injections of morphia. Quinia and tonics were also given, but with negative results in both cases. A case of sciatica, following gonorrhœa, which recently occurred in my practice, was most unexpectedly relieved, instantly and permanently, by a single application of the strong induced current.

The treatment of other sequelæ presented no points of special interest.

GENERAL OBSERVATIONS.

The importance of gonorrhœa as a cause of loss to the Government seems to me to be generally underrated. It is no uncommon thing to meet with medical men who, on the one hand, will refuse to excuse a man from duty for so trivial a complaint as a "clap," and send him off with a bottle of Chapman's mixture and a syringe; or who, on the other hand, do not scruple to assert that the cure of gonorrhœa is not within the power of medical art; that the disease is likely to get well in time of itself, but that nothing which the surgeon can do will hasten such a result.

That many cases do recover which are neither reported to the surgeon at all nor treated in any way, there is no doubt, and that many treated *secundum artem*, both on shipboard and ashore, prove exceedingly obstinate, is equally true. But the shoals of men suffering from stricture, fistula of the anus and perineum, and hæmorrhoids, which crowd our naval hospitals, and the proverbially frequent introduction of gonorrhœa into ports frequented by sailors, who go ashore suffering from chronic gleet, speak badly for the non-interference doctrine. And it would seem that the experiences of the Idaho detailed above

furnish good evidence of the benefits of medical treatment, with the loss to Government of comparatively very little time. But twenty-three patients admitted from the Idaho reported their disease at or near its inception; and of these twenty-three but nine suffered from any sequelæ whatever, viz, epididymitis, 3; gleet, 4, and rheumatism, 2, these being sequelæ not easily guarded against. It can by no means be claimed that these results are due to the employment of any especial or novel medication. I believe that they are due entirely to the invariable rule of the surgeon in charge, of relieving a gonorrheal patient from duty at once, and enforcing absolute quiet in bed, with low diet, during the earlier stages of the disease. The medical treatment employed was at best but palliative, tending to hasten the processes of recovery, but entirely inefficient by itself for their production. I have no doubt that the general adoption of this rule, notwithstanding the apparent absurdity of making so much ado about so trifling a disease, would result not only in a great ultimate saving of labor to the Government, but in a sensible diminution of venereal diseases in ports visited by our ships. One of the firmest articles in the sailor's creed is the belief that he will never get rid of his gleet until he has given it to some one else; and although his experience has taught him a therapeutic fact of some value, the results of this belief are often most disastrous to the inhabitants of the places he visits.

If the experience of the Idaho in the Asiatic squadron be not altogether exceptional, but represents with fairness the experience abroad of the Navy as to venereal diseases, it is very evident that the subject is of sufficient importance to demand careful examination, with a view to the abatement of the evil, and to its prevention so far as is possible. Neither the scope of this report nor the experience of the writer is such as to warrant any original suggestions upon this important subject; but it may not be out of place to refer here to some steps which

have been taken elsewhere in the same direction and to discuss their results.

The admiral commanding was thoroughly awake to the importance of this class of diseases as a cause of injury to the efficiency of the squadron, and issued, from time to time, general orders upon the subject, with a view to lessening their prevalence. Nagasaki and Kobé (a newly-opened port) appearing to be the ports from which the larger number of cases in Japan originated, at different times, liberty in these ports was stopped altogether. These orders fell into disuse from various causes. The boat's crews necessarily visited the shore frequently and contracted disease, and the long stay of some of the ships which were stationed at these ports rendered it almost impossible and very injurious to keep the crews so closely confined. Moreover, the men would seize every opportunity for absenting themselves without leave, eluding pursuit for two or three days at least, and meanwhile would succeed in contracting disease to almost as great an extent as before.

March 16, 1869, a general order was received requiring an examination by the surgeon of all liberty-men before leaving the ship and after their return. But, believing that to the more respectable men such an inspection would prove degrading, and tend to lowering their moral tone,* petty officers, married men, and all over 35 years of age were exempted. An examination of the medical journals, however, showed that the large majority of cases occurred within the numbers of these three classes, so that this order also proved ineffectual. Moreover, since the disease prevailed extensively on shore, and it was not to be hoped either that the brothel-keepers would inaugurate any preventive measures, or that the men would refrain from indulgence, the operation of the order tended only to the

* An opinion shared by Admiral Sir F. Grey, Royal Navy: "It would not be expedient to subject all our respectable seamen and married men to the degradation of being inspected in that way, under the suspicion of their having disease." (Report of British admiralty commission, question 7,045.)

prompt application of remedial measures, and not at all to the prevention of the disease.

At about the same time Surgeon Gibon tendered to the Japanese government, through the American consul, the gratuitous services of the medical staff of the Idaho for the management and conduction of a lock-hospital, to which all prostitutes should be compelled to report for examination at stated intervals, and wherein, if diseased, they should receive proper medical treatment. As prostitutes are already registered by Japanese law, there would have been little difficulty in carrying out this plan, but the offer was declined.

The Russian government had obtained semi-official possession of a deserted village called Hinassa, across the harbor from Nagasaki. When any Russian ships arrived at the port they were accustomed to allow a certain number of women to migrate to this village, where they were placed under the charge of a surgeon. The crew were then turned loose ashore only at this village, one watch at a time, during the stay of the ship. This characteristically direct proceeding proved eminently effectual, the amount of venereal disease on Russian ships being very small.

The importance of the subject had attracted the attention of the British government so early as 1864, and led to the appointment by the admiralty of a commission, composed of Mr. Skey, (chairman,) Dr. Balfour, Mr. Cock, Dr. Donnet, Mr. Quain, Mr. Samuel Wilks, and Mr. Spencer Smith, who were directed to investigate the causes and treatment of, and to recommend measures of prevention for, venereal diseases in the army and navy. After lengthy examinations of fifty-six medical gentlemen, and a very exhaustive analysis of information from various sources, the committee rendered a report in 1867, accompanied by the evidence upon which it was based.

In view of the heavy loss* accruing to the service from these

* *Vide* note, p. 4.

diseases, (much less, be it noted, than that of our squadron in Asia,) the committee earnestly recommend, that—

"1st. A periodical examination of all known prostitutes be made compulsory, under a well-organized system of medical police.

"2d. That a surgeon be appointed by government to each town for this duty, * * * and that such surgeon be provided with the necessary powers for sending to lock-hospitals all women found to be diseased, * * * and for retaining them there until cured or restored to their friends. * * *

"4th. That the operation of the act be extended to all garrison and sea-port towns in the kingdom."*

"However efficiently the regulations as regards women may be carried out, their success in arresting the spread of disease must be very imperfect unless similar precautions be adopted for preventing the men from carrying infection to the women," (p. 30.) "All the men of both services are inspected at fixed times with a view to their general health. * * * These examinations are known as 'health' inspections, and in the judgment of the committee are incomplete in a very material point, inasmuch as they leave unseen the parts so frequently the seat of contagious disease," (p. 31.) "Complete examinations," say the committee, "were customary prior to 1859, and are still in some cases kept up by regimental order." They recommend that the examinations be resumed, that as much responsibility as possible be attached to the men, by punishing those who fail to report and are discovered only by the examination. They recommend also as a subsidiary measure that additional conveniences for ablution be provided.

Dr. T. Graham Balfour, of the British army, a member of the committee, dissents from these recommendations, on the ground that such examinations would be likely to lower the

* Report, p. 24.

morale of the men, to deter enlistments, and to produce great dissatisfaction among medical officers, (p. 36.)

In Yokohama the prostitutes were all confined to a single quarter of the town, formerly known as the Gan Kairo, and now as the Yōshiwarra. At the extremity of this quarter (which is walled and guarded) is the lock-hospital, built and maintained by the Japanese government, but presided over (during our stay) by the late Dr. Newton, R. N., who had been detailed for this duty. To this quarter all women found plying their trade as prostitutes in the city are sent, and all are subject to semi-weekly examinations at the hospital, those found to be diseased being retained until they have recovered. This system had been in operation for about a year when the Idaho arrived at Yokohama, with most encouraging results. Already the men had learned to profit by the immunity from disease in this quarter of the town, and Yokohama had become, from one of the worst, the least injurious port of Asia in this regard.*

The circumstances are so entirely different that it would be manifestly impossible to follow the example of the British government in the examination of prostitutes on shore for the benefit of the United States Army and Navy. Nor is it probable that the Russian method of cutting the knot, involving as it does the official recognition of venereal indulgence as a necessary evil, will commend itself to the judgment of many of our officials. Should this class of diseases ever become so prevalent as to call for Government action, it is probable that inquiry and experiment will be best rewarded in the direction of periodical examinations of the men, subjecting them to treatment in the earlier and more manageable stages of disease; and of tenders of professional assistance to the native authorities in ports which have become particularly injurious in this regard.

* *Vide* Sanger's History of Prostitution for detailed accounts of the favorable results of similar proceedings, on a much larger scale, in various parts of Europe.

PREVALENCE OF SMALL-POX IN THE UNITED STATES NAVY,

WITH

AN INQUIRY INTO THE CAUSES FOR SUCH PREVALENCE AND FUTURE MEANS FOR PREVENTION.

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The records of the Bureau and Medicine and Surgery do not afford sufficient data for an extension of this inquiry into the prevalence of small-pox within the United States Navy beyond the year 1845.

The following table exhibits the average strength of the naval force, the number of cases of small-pox reported, the number of deaths from small-pox, and the number of deaths from all causes during each of the twenty-six years included in this inquiry, except for the first five years of this period, the annual average strength and the annual deaths for which years the records fail to give:

Year.	Average strength of naval force.	Cases of small-pox.	Deaths from small-pox.	Deaths from all causes.
1845	.....	40	3	.....
1846	.....	62	5	.....
1847	.....	5	1	.....
1848	.....	35	1	.....
1849	.....	7	.....	.....
1850	9,087	187	12	129
1851	9,063	9	3	85
1852	9,103	12	.....	81
1853	9,051	33	.....	84
1854	8,975	9	.....	101
1855	8,982	10	2	115
1856	9,962	2	.....	119
1857	10,163	51	6	123
1858	11,895	12	.....	155

Year.	Average strength of naval force.	Cases of small-pox.	Deaths from small-pox.	Deaths from all causes.
1859	11,405	9	1	115
1860	11,030	26	1	121
1861	20,030	61	3	178
1862	25,905	56	4	555
1863	40,000	141	17	1,042
1864	43,767	419	42	1,373
1865	32,641	187	16	930
1866	17,193	51	6	319
1867	13,492	28	1	309
1868	15,692	54	9	129
1869	13,863	45	3	148
1870	11,807	79	7	119
Total for twenty-one years	342,946	1,481	175	6,550

No attempt is here made to divide the cases of variolous disease into variola and varioloid disease, although in a majority of the reports from which these data have been collated such a distinction is made. It is evident, however, from an inspection of them, that this distinction has been based upon no uniform system of classification, but that in each case it has been entirely arbitrary, according to the judgment of the particular medical officer making the report, while in many cases no distinction at all is made, but all are reported as cases of variola. Every case, therefore, without regard to its special modifications, has been included under the one designation of small-pox in this inquiry.

During the year 1845, eight cases of small-pox were reported as having occurred on board the United States sloop Vincennes; none fatal. No other particulars are recorded.

In November of the same year, small-pox made its appearance on board the United States frigate Columbia, which had a ship's company of 496 persons. The first case, in the person of a private of marines, who had been received a few days before from Washington, D. C., developed the characteristic eruption on the third day after the sailing of the ship from Hampton Roads. The disease, with this origin, prevailed in the ship until the

last of the March following. During its course sixty-nine cases occurred; four of them fatal. Vaccination of the crew was commenced the day after leaving port. Crusts, procured at Norfolk, Va., were used in the performance of these vaccinations. *In not a single case was a successful result obtained.**

In the year 1846, twelve cases of small-pox, with one death, occurred on board the United States steamer Plymouth. No other particulars recorded.

In the year 1848, twenty-five cases were treated at the Naval Hospital, New York. There was one death. No particulars as to their origin are recorded.

In the winter of 1850, the United States frigates Independence and Cumberland, forming a portion of the Mediterranean squadron, suffered extremely from small-pox. In the Independence, among a ship's company of 560 persons, there were one hundred and sixteen cases; seven of them fatal. On the Cumberland, among a ship's company of 453 persons, there occurred sixty-two cases; four of them fatal. With regard to the epidemic on board the Independence, Fleet-Surgeon W. Whelan, under date of Naples, August 15, 1850, reports as follows:

"Small-pox and varioloid appeared on board this ship about the middle of December, while our crew were on liberty in Naples; though the Cumberland and Mississippi were similarly circumstanced, the disease did not manifest itself on board the former till after her arrival at Messina; the latter escaped entirely. The crew of this ship (the Independence) almost universally presented what are regarded as genuine vaccine marks. The protection, however, proved to be quite imperfect. Revaccination was attempted, but the contagion had spread too widely to be influenced by the process. The disease presented many peculiarities, and, in some instances, was fatal beyond our experi-

* Letter from Surgeon B. N. Tinslar to the Chief of the Bureau of Medicine and Surgery.

ence. In two cases death ensued in about forty-eight hours, from sphacelated throat, an eruption appearing after death. The malignity of the throat-symptoms is considered a peculiar feature of the disease as it prevails at Naples. I have heard of many such cases as I have mentioned, in which the eruption after death determined the character of the malady, the throat-affection proving rapidly fatal. Small-pox and varioloid were very prevalent in Naples from October, 1849, till the following spring, though vaccination is in very general use. The winter was almost unprecedentedly severe. The hills in the vicinity of Naples were covered with snow till May."

With regard to the epidemic on board the Cumberland, Surgeon Samuel Barrington appends the following remarks to the quarterly report of sick for that vessel of March 31, 1850:

"Small-pox has prevailed in all its different shades, from the mildest form of varioloid to the most malignant form of confluent variola. The first case occurred on the first day of January, fourteen days after leaving Naples for Messina; but, as the disease was also prevalent in Messina, it is somewhat doubtful whether it was contracted first at the former or the latter place. Out of the sixty-two cases, four terminated fatally. When the disease commenced spreading it was thought expedient to seclude the variolous patients from the healthy portion of the crew, for which purpose a brig was chartered and placed in charge of Passed Assistant Surgeon Hudson. The cases, as they occurred, were sent on board; and to this, in a great measure, is to be attributed the exemption from a still greater extension of the disease."

Assistant Surgeon E. R. Squibbs, United States Navy, in an account of this cruise of the Cumberland, published in the American Journal of Medical Science for July, 1851, states that all on board who did not exhibit satisfactory evidences of vaccination or small-pox had been vaccinated some months

before the outbreak of this epidemic, but only one or two equivocal pustules were obtained as the result of the vaccinations performed.

No epidemic of small-pox occurred throughout the Navy during the years 1851 and 1852. During the spring and summer of 1853, twenty cases of small-pox occurred on board the United States steamer Jamestown, in the Brazilian squadron; all of which recovered. The number of persons in the ship's company is not recorded. Beyond the fact that two of the first cases were sent ashore for treatment, one at Buenos Ayres, and one at Montevideo, previous to the sailing of the ship for Rio Janeiro, there is no record of the adoption of any special measures for the arrest of the disease.

In the winter of 1853 and 1854 there occurred, on the United States frigate Columbia, serving in the home squadron, with a ship's company averaging 460 persons, sixteen cases of small-pox, all of which recovered. In his report of sick for the quarter ending December 31, 1853, Fleet-Surgeon Solomon Sharp states:

"We sailed from New York on the 4th day of December. The same evening Alfred Hornsby was seized with febrile symptoms, and on the fourth day thereafter an eruption began to make its appearance, which, during the next two days, became general, and fully developed itself as modified small-pox. A few days later two more cases appeared. These three men had good vaccine scars. From that time till our arrival at St. Thomas, on the 18th, no new cases reported themselves. On the evening of our arrival another case was discovered, and all were landed at a temporary hospital assigned to us by the authorities on shore. Since then seven others have been attacked, all of which are mild cases, and evidently much modified by previous vaccination. Owing to the inclement weather we experienced after leaving New York we were compelled to keep

the sick on the berth-deck, and consequently the eruption in the first three cases was much increased, even approaching confluence, but the modifying influence of vaccination has been strikingly exemplified in all."

In his report of sick for the quarter ending March 31, 1854, Fleet-Surgeon Sharp states in addition:

"On the arrival on board this ship (Columbia) of the recruits from New Orleans they were examined with reference to their protection against variolous diseases, and all doubtful cases were vaccinated with virus we had procured at Norfolk, Va. But few spurious pustules were produced. Again, on our arrival at St. Thomas, as soon as we could procure fresh virus, which we received from the Fulton, we again vaccinated. But one case took, and the variolous disease appeared simultaneously with the vaccine, and they ran their course together. It has ever been my experience that it is difficult to effect vaccination in a sea-going ship."

During the years 1855 and 1856 the Navy again escaped any epidemic visitation of small-pox.

During the year 1857, seven cases occurred among the recruits on board the receiving-ship North Carolina at New York, and five cases on board the receiving-ship Alleghany at Baltimore. Five cases also occurred on board the United States steamer Niagara. No particulars in regard to these cases are recorded.

During the winter and spring of this year, twenty-eight cases of small-pox occurred on board the United States sloop-of-war Levant, in the Asiatic squadron, among a ship's company of 166 persons. Five resulted fatally.

The following account of this epidemic is furnished by Medical Inspector A. L. Gihon, one of the medical officers of the Levant during the period in question:

Extract from medical synopsis of the cruise of the United States sloop-of-war Levant, in the China Sea, during the years 1855, 1856, 1857, *and* 1858.

"The beginning of the year 1857 was signalized by an outbreak of variola. After the capture and destruction of the Barrier forts (near Canton) the Levant moved down the river, and, from December 20, 1856, to March 3 following, lay at anchor in the harbor of Hong-Kong. The daily list of sick never fell below thirty, though numerous desertions had contributed to reduce the aggregate ship's company to 166, including officers and servants. The additional labor of "rowing guard" all night was imposed on the men, while, as heretofore, the duties of the day were unremittingly exacted, the ship employing no Chinese "fast boat" nor native boatmen. During February she was ordered to Manila with the sick and wounded of the squadron, to find passage for them to the United States. On the 23d of that month John Russell, ordinary seaman, reported himself ill with the ordinary symptoms of an attack of fever, but on the 27th a discrete pustular eruption was developed and recognized to be variolous. Still no new case had manifested itself when the day appointed for sailing (March 3) had arrived, nor on the 11th, when she entered Manila Bay; hence the quarantine officials made no objection to her anchorage; but on the 13th the second case declared itself, followed the same day by the third, and by one on the 14th, 15th, and 16th, respectively, three on the 17th, two on the 20th, two on the 23d, four on the 24th, one on the 25th, two on the 26th, one on the 27th, one on the 5th of April, one on the 10th, two on the 12th, two on the 14th, and one, the last, on the 8th of May, a total of twenty-eight cases, of which an unusually large proportion were confluent, in consequence of the cachectic condition of those attacked. Indeed, those only whose constitutional vigor had been impaired were affected, the disease manifesting no tendency to

indiscriminate spreading among the healthy members of the crew. When the first case appeared attempts were made, and subsequently repeated, to vaccinate those who were considered insufficiently protected; but, whether from deterioration or worthlessness of the virus used, no satisfactory results were obtained, and, indeed, the only decided case of constitutional respondence—Charles B. McFadden, ordinary seaman—resolved itself into an aggravated form of confluent disease, and terminated fatally on the twelfth day. Four other cases were attended with fatal results.

Ira S. Price, seaman, died on the third day with variola maligna. He was an old fever-patient, and this attack began as others to which he had been accustomed, but the febrile reaction was inordinately high, and on the second day, during the night, he stealthily left his cot under the top-gallant forecastle, went into the "head," where he divested himself of all his clothing, and pumped cold water on his body for more than twenty minutes. This was not discovered by the attendants till the following morning, when an explanation was sought for the extraordinary brilliant redness of the general surface. Vibices and ecchymosis soon became numerous over the thorax and abdomen, and death by asthenia rapidly followed, the cerebral functions not having been at all disturbed.

In the case of William Van Zant, seaman, death ensued on the fourteenth day. This man was ill with chronic dysentery at the time he was attacked with variola. He was debilitated and emaciated, and from the outset his symptoms assumed a typhoid form. John McDonnell, ordinary seaman, died of confluent variola on the twelfth day. His was an exceedingly severe case, and was complicated with cerebral symptoms from the beginning. The eruption appeared early on the second day, and the patient was so uncontrollably restless that every portion of the entire cuticular surface was denuded. Joseph Fisher,

captain of the foretop, the last fatal case, died on the thirteenth day. There is a circumstance connected with the history of this patient that deserves especial note. The Levant sailed from Manila for Shanghai on the 20th March. The passage of eight hundred miles was accomplished after a beat of nineteen days against the northeast monsoon. Fisher's attack was undoubtedly determined by an unnecessary piece of exposure, against which I remonstrated in vain when it was ordered. On the day previous to his illness, the watch of foretop-men, of which he was captain, was employed in bending a new foretop-sail from ten o'clock in the morning until noon, the thermometer standing at 126° Fahrenheit. The urgency of the case was pleaded in excuse, although the weather was fine all day long, and though others concurred with me in the opinion that the work could have been as well done early in the morning or late in the evening. On the following two days, seven of these foretop-men reported on the sick-list. Two of these were cases of variola, that of Fisher, and James Dickey, seaman. The others were various derangements of the hepatic function. All were successfully treated except Fisher, whose duties as captain of the top kept him longer exposed to the influence of the exciting cause, and whose system had been already enfeebled by a recent attack of acute dysentery. The small-pox cases were all huddled together under the top-gallant forecastle, a narrow space of the spar-deck extending only from the foremast to the bows of an old-fashioned sloop of war, encumbered by the heel of the bowsprit, scuttle-butt, fore-bitts, and manger amidships, and by water-closets on both sides, and constantly flooded by seas pouring through the hawse-holes and bridle-ports. Here they were so closely packed together in two tiers, cots below and hammocks above, that access could only be had to them by forcing them apart; this, with the exposure to inclement weather in this wet, unclean place, of which the ordinary dis-

comforts were manifoldly aggravated by the ceaseless rolling and pitching of vessels of this class when on a wind, operated to make the issue, of the confluent cases especially, still more unfavorable. All these suffered such intolerable itching, and were so restless, that they tore and rubbed off every particle of protective cuticle, or scab, exposing horrible ulcers involving the entire trunk and extremities, and requiring the permanent application of roller-bandages, which soon became saturated with pus and disgustingly offensive. The crowded state of these quarters, the best available, and indeed the only isolation outside of the commander's apartments in the cabin, offered by the ship; the limited force of medical attendants, one medical officer, the other being himself helplessly ill, a hospital-steward and two nurses; and the large number of invalids with other diseases also requiring attention in the sick-bay on the berth-deck, the daily sick-list averaging for the quarter $32\frac{65}{90}$, in a complement of only 166 men and officers, necessarily deprived these men of that ceaseless attention, watching, cleansing, and dietetic treatment which their condition imperatively demanded. Peter Anderson, seaman, and Robert Dixon, captain of top, were instances of perhaps equally serious disease, but both experienced the benefits of removal on shore to the temporary hospital which I established immediately on arriving at Shanghai. The last case, William Da Souza, landsman, was discharged May 17, and early in June the hospital was closed and the disease declared ended. During the following quarter, the daily sick-list averaged only $22\frac{64}{91}$. The whole number of admissions during the quarter was one hundred and six, of which nine were with diarrhœa and ten with dysenteria. The virulence of the eruptive disease appeared to have operated beneficially in checking the tendency to these intestinal complaints which had hitherto been so rife.

During the years 1858 and 1859, the Navy again escaped any

visitation from small-pox, to an epidemic extent. The occurrence of six modified cases among the recruits on board the receiving-ship North Carolina, at New York, during the year 1858, was the only instance of the occurrence of any but isolated cases during this period.

During the year 1860, seven cases of small-pox are reported to have occurred among the vessels of the Mediterranean squadron, and eight cases on board the United States steamer Iroquois; none fatal. No other particulars are recorded.

With the rapid increase of the naval force in 1861, there was an impetus given to the prevalence of small-pox, so that throughout the years of the war of the rebellion the Navy suffered to a considerable extent from its ravages; although the proportion of cases to the total strength of the Navy was no greater than had repeatedly occurred before. At the various depots for recruits the disease was constantly present; thus, at the naval station, New York, in 1861, there occurred 20 cases, with 2 deaths; in 1862, 7 cases, no death; in 1863, 8 cases, no death; in 1864, 40 cases, with 7 deaths; and in 1865, 23 cases, with 5 deaths.

Of the large number which occurred in 1864, by far the greater proportion occurred among a large number of ex-rebel prisoners, who, having taken the oath of loyalty, had been forwarded from the West, for service in the Navy. The disease broke out among them soon after their arrival in New York. They were all at once vaccinated. At the Philadelphia naval station, 7 cases, with 1 death, in 1861; 4 cases, no death, in 1862; 3 cases, no death, in 1863; 11 cases, 2 deaths, in 1864; and 20 cases, with 1 death, in 1865, occurred.

At the Washington naval station there occurred 13 cases, no death, in 1861; 29 cases, with three deaths, in 1862; 5 cases, no death, in 1863; 7 cases, no death, in 1874; and 2 cases, no death, in 1865. The large number of cases reported from the

Washington station in 1861 and 1862 were in great part accumulated from the vessels of the Potomac flotilla, the cases having been sent for treatment to the hospital established at Washington. In addition, 6 cases, none fatal, were reported directly from the Potomac flotilla in 1865. Upon the receiving-ship at Baltimore there were 3 cases, with 1 death, in 1863; 9 cases, with 2 deaths, in 1864; and 1 case, no death, in 1865. At the Boston naval station, there occurred 1 case, no death, in 1863; 9 cases, no death, in 1864; and 4 cases, with 2 deaths, in 1865. At the naval station, Kittery, Me., there were 5 cases, no death, in 1864. At the Norfolk, Va., station there were 24 cases, none fatal, in 1864; and 4 cases, none fatal, in 1865. During both 1861 and 1862, small-pox did not prevail upon any vessel of the Navy in epidemic form, the occurrence of a few isolated cases being the utmost suffering occasioned by the disease. During 1863, 1864, and 1865, throughout the naval force which had been organized upon the Mississippi River, small-pox prevailed to some extent—50 cases, with 9 deaths, in 1863; 146 cases, with 19 deaths, in 1864; and 58 cases, with 5 deaths, in 1865, are reported as having occurred in that squadron alone. No particulars with regard to the various outbreaks of the disease, which resulted in the number of cases reported, are recorded.

In 1863 10 cases of small-pox, none fatal, occurred in the South Atlantic squadron; 5 cases, 1 death, in the Pacific squadron; no other particulars recorded with regard to these cases. In this year there occurred on the U. S. S. Commodore Barney 10 cases, with 2 deaths; further particulars wanting. In the fall of 1863 there occurred among a ship's company of 162 persons, on board the U. S. S. Dacotah, on blockade duty off Wilmington, N. C., 41 cases, with 3 deaths. With regard to this epidemic, Surgeon D. Bloodgood, in a communication to the Bureau of Medicine and Surgery, dated Hampton Roads,

Va., October 31, 1863, states: "On September 26, ultimo, while on the blockade off Wilmington, N. C., a case appeared which subsequently developed into confluent small-pox. This patient was last out of the ship September 14, at Baltimore. It was deemed unadvisable to endanger another ship by sending this patient by her to Beaufort, when she went for coal, and when we went, in turn, for coal, October 9, the surgeon of the Army hospital there declined receiving such cases. Not till October 15 was any one else on board attacked with the disease. On that date 3 cases were developed; on the 16th 5; 17th, 3; 18th, 11; 19th, 4; 20th, 2; 21st, 1; 22d, 1; 25th, 1; 27th, 1; and to-day, the 31st, 2 cases of suspicious nature were admitted. Fourteen of the cases are confluent, a majority of the others quite mild. Each and every one had been vaccinated at some period of his life. * * * On our passage to this port we were five days in a gale of wind, through which the sick suffered terribly. Three deaths have occurred."

During 1864, 21 cases of small-pox, with 1 death, were reported from the North Atlantic blockading squadron, without other particulars; 15 cases, none fatal, were also reported from the West Gulf blockading squadron.

The ships New Hampshire and Vermont, attached to the South Atlantic blockading squadron, both at Port Royal, S. C., suffered from epidemic attacks of this disease during this year. Upon the latter there were 15 cases, none fatal; upon the former, 38 cases, with 4 deaths; 18 additional cases, with 1 death, are reported from this squadron during this year. Other details with regard to these epidemics are wanting.

Upon the U. S. S. Jamestown, serving in Japanese waters, there occurred this year, among a ship's company of 214 persons, 31 cases of small-pox, with 4 deaths. The entire crew had been vaccinated after leaving the United States.

Upon the U. S. S. Juniata, in the autumn of this year, at

Rio de Janeiro, among a ship's company of 237 persons, there occurred 20 cases of small-pox, all of which recovered. Surgeon A. C. Gorgas, in a communication to the Bureau of Medicine and Surgery, dated Santos, Brazil, March 31, 1865, states: "The varioloid made its appearance on board ship about the 22d of November, the ship being at Rio de Janeiro. The first 3 cases were sent on shore to the hospital at Gamboa. The ship was moved over to the Praya Grande side of the harbor, and all communication with the shipping cut off; and as there was a probability of the cases becoming numerous, a part of the top-gallant forecastle was screened off for the milder cases, and those only with profuse eruptions and severe symptoms sent to the pest-house. In all, there were 8 sent ashore. Most of the cases were mild, and all are now well or convalescent. The officers and ship's company were promptly vaccinated on the appearance of the disease, with fresh virus obtained from the shore; but one case, that of an officer, was successful. The Juniata had come out of dock on the 13th of November, having been lying there, undergoing repairs, about a week. As the disease prevailed on shore, it is probable that it was received on board during that period. The last case was admitted November 28th."

Upon the U. S. S. Iroquois, also in Brazilian waters, there occurred this year 5 cases of small-pox, with 1 death. Further details wanting. During the year 1865, 15 cases of small-pox, with 1 death, were reported from the South Atlantic blockading squadron; and 40 cases, with 2 deaths, from the West Gulf blockading squadron, of which number 21 cases, including the 2 fatal cases, occurred on board the U. S. S. Cincinnati. Further details are wanting.

During the year 1866, isolated cases of small-pox were quite numerous, occurring at no less than twenty different points, without occasioning further diffusion of the disease in any case.

Upon the receiving-ships New Hampshire, at Norfolk, Va., and Grampus, at Mound City, Ill., only did the disease prevail to any extent; 11 cases occurred on board the former, and 5 on board the latter; none fatal.

During the year 1867, 7 cases, with 1 death, occurred on the United States steamer Pawnee; and 3 cases, none fatal, on the United States steamer Guerriere; both vessels being in the South Atlantic squadron. Eight cases also occurred among the vessels of the Asiatic squadron, none fatal, viz, on the Hartford, 4; Wyoming, 3; and Ashuelot, 1. No details with regard to the circumstances attending any of these cases are recorded.

During the year 1868, 10 cases occurred on board the United States steamer Franklin, in European waters; all recovered. With regard to these cases, Fleet-Surgeon J. M. Foltz appends the following note to the report of sick for the first quarter, 1868, for that vessel:

"A case of confluent small-pox occurred on board the Franklin while at Naples, on the 29th of March, which was immediately transferred to a hospital ashore for treatment. The officers and crew were revaccinated. Up to this date, May 17, we have had five slight cases of varioloid, of which but one case remains under treatment. Variola prevails extensively at Naples, Malta, and also at Lisbon."

During this year the United States steamers Iroquois and Oneida, in Japanese waters, both suffered severely from epidemics of small-pox. On board the former, 15 cases, with 3 deaths, among a ship's company of 179 persons, occurred; and on board the latter, 17 cases, with 6 deaths, among a ship's company of 173 persons. Other details with regard to the Iroquois epidemic are wanting. With regard to that of the Oneida, Surgeon James Suddards, in a communication to the Bureau of Medicine and Surgery, dated Off Hiogo, Japan, April 20, 1868, states:

"In the latter part of February a case of small-pox occurred on board the United States steamer Iroquois, then lying off Hiogo. The patient was removed to a house on the beach at Kobé, and died in a few days. It was understood that the contagion had been traced to a house at Osaka, where some of the Iroquois' men had spent a night. As the disease showed signs of spreading, the vessel was dispatched to Yokohama, where, it was believed, hospital-facilities would be found. A few days afterward this ship proceeded to Osaka, with the United States minister on board. On the 7th of March, two men were seized with unmistakable symptoms of small-pox, and both died within three days from the first seizure, without the appearance of the diagnostic variolous eruption. I am satisfied, after the fullest inquiry, that both must have been attacked by reason of exposure to contagion from the patient from the Iroquois, both having been called by their duty in the immediate neighborhood of the hut in which he died. Both were exceedingly delicate and frail persons. On the 11th of March the ship returned to Hiogo. Although, as stated above, no diagnostic eruption had shown itself in either of the cases, the cause of death is entered on the medical journal as variola maligna, and the commanders of foreign men-of-war in port were so informed. Measures were immediately taken to prepare for the disease in case it should re-appear. Through the intervention of the United States consular agent a large house was secured close to the beach at Kobé, windows were cut, bedsteads made, and everything done to fit it for hospital purposes. On the 19th, 6 cases presented themselves; on the 20th, 3; the 21st, 3; the 25th, 2; and on the 27th, 1. With one exception, all these had slept on the berth-deck, in the vicinity where one of those first attacked had lain before he was removed to the deck above. They were all sent to the hospital. * * * * On the 22d, Assistant Surgeon Edward Frothingham and five nurses, pro-

tected by previous attacks of small-pox, were detailed to remain on shore and take charge of the hospital. From that date no communication of any kind was permitted between the ship and hospital, excepting through the hospital-boat. The whole number of cases, seventeen, that thus appeared between the 5th and 27th of March may be divided into the following classes:

Variola maligna	4
Variola confluens	2
Variola discreta	2
Varioloides	9

"Besides these there are four others, classified in the report as febris continua communis, which, from their period of accession, peculiar symptoms, and decline, with rapid convalescence after the third day, might not improperly be regarded as variola sine eruptione, 4.

"The malignant and confluent cases all died; two on the third day, two on the fourth, one on the eleventh, and one on the thirteenth. The others are convalescent. * * * After syphilitic and cutaneous affections, small-pox may be considered the most common disease of Japan, having its headquarters at Osaka and Hiogo. I may say, without exaggeration, that one-half of the adult population of these two cities show marks of having had the disease. It becomes epidemic every winter and spring, being most prevalent at this place in April. Isolation of those attacked is not attempted, a mark, as a red rag, only being affixed to some part of the person. Vaccination is practiced by the Japanese physicians, but under what circumstances and with what results I have been unable to learn, but am informed that it is never repeated after the first trial. Foreign vessels of course are more or less exposed, and experience teaches that occasional outbreaks must be expected. The United States sloop Jamestown was almost crippled some years ago. Within a short time Her Britannic Majesty's ship Prin-

cess Royal had one hundred and fifty cases, and was compelled to go to Hong-Kong to get rid of the pest. The steam-sloop Serpent, Commander Bullock, was infested with it for four months last year, having twenty-four cases out of a crew of less than one hundred men. The Iroquois and Oneida this year are similar examples. It is important, therefore, that means may be at hand, as soon as the epidemic appears, to limit its ravages. * * * I cannot close this report without bearing testimony to the cheerfulness and untiring zeal with which Assistant Surgeon Edward Frothingham performed his duties while in charge of the small-pox hospital. During the whole course of the epidemic his attention to the sick was unwearied, and I cannot too highly express my sense of his services on the occasion."

During 1869, there occurred on board the United States steamer Jamestown, at San Francisco, among a ship's company of one hundred and ninety-four persons, twenty-seven cases of small-pox, with one death. Twelve cases, none fatal, occurred on board the United States steamer Monocacy, in Japanese waters, during this year, among a ship's company of one hundred and seventeen persons. Further details with regard to these epidemics are wanting.

In the summer of 1870, seven cases occurred on board the United States steamer Portsmouth. With regard to these cases Fleet-Surgeon Joseph Wilson, in the report of sick of the South Atlantic squadron for the third quarter, 1870, states: "On board the United States steamer Portsmouth there were seven cases of small-pox. This is referred to contagion received by one of the men at Montevideo; and the disease breaking out at sea, it was not possible to isolate him sufficiently to prevent the spread of the disease among the crew.

During this year, sixty-one cases, with five deaths, occurred on board the United States steamer Franklin, in European

waters, among a ship's company of five hundred and ninety-seven persons. With regard to this epidemic, Fleet-Surgeon Charles Eversfield, in a communication to the Bureau of Medicine and Surgery, dated Flushing, Holland, August 8, 1870, states: "I have to report the occurrence of an epidemic of variola, of unusual severity, on board this ship. The following are the particulars: The ship sailed from Lisbon on the 18th June, for this port, with a crew and officers numbering 597, all in good health. On the 26th June, the eighth day out, in latitude 32° 33′ N. and longitude 19° 28′ W, one of the crew who had not been out of the ship at Lisbon, and had an excellent vaccine scar, was admitted on the sick-list with fever. The true nature of the disease was not discovered until the second day after his admission. He was then placed on the after part of the gun-deck, near an open gun-port, with a canvas screen around his cot, sentries placed to prevent the approach of any of the crew, and men selected, who had had small-pox, to attend upon him. The officers and crew were immediately vaccinated with fresh vaccine-matter obtained at Lisbon, this vaccination* being the third one during the cruise. Steam was immediately gotten up, and we arrived at Downs, England, July 5. The man was sent to the hospital of the Royal Marine Depot, at Walmer, on the morning of the 7th July, nine days after his admission to the sick-list, the case being one of confluent variola. He has since recovered. On the 17th July, ten days after the transfer of the first case to the hospital, and nineteen days after his seizure, another case appeared, and was immediately sent to the quarantine-hospital at this place. On the 18th,

* Dr. Eversfield, in a private letter, referring to these vaccinations, says: "I think about 10 per cent. of those vaccinated were successful. Many of those vaccinated presented excellent scars of former vaccinations; none of those were successful. Of those successfully vaccinated, I think none took the disease; but many of those who did take it, and some of the bad cases, had excellent vaccine-marks."

seven more cases; on the 19th, sixteen more cases were sent, and the ship was placed by the health authorities under strict quarantine. Other cases followed from day to day, until the 26th July, when the total number had reached fifty-eight. Since then no new cases have occurred, and the ship was released from quarantine on the 2d of August. Of the above number there were fifteen cases of very bad confluent small-pox; the remainder discrete, but in many cases very severe. Of the confluent cases we have lost five. We have now in hospital twenty-five cases, many of them feeble, but all convalescent. This disease has been epidemic in many places in Europe during the present season, but I hoped our vaccinations would prevent trouble with it on board ship.

"I beg here to mention the very handsome conduct of Surgeon Thomas J. Turner, of the Juniata. Hearing at Antwerp of the outbreak of the epidemic on board the Franklin, and knowing our deficient number of medical officers, he immediately volunteered to come to our assistance, and was permitted to do so by his commanding officer. He got here on the 21st, and since that time has been unremitting in his attentions to the sick, and but for his untiring devotion, I believe the mortality would have been greater. Although the quarantine-hospital here is nominally in charge of its own physicians, we have been kindly permitted to superintend everything appertaining to the treatment, comfort, and nursing of our own men. We found the place uncleanly, entirely unorganized, and without comforts or conveniences of any kind, and the diet-list entirely inadequate to the wants of our men. These deficiencies we have provided for, at as little expense as possible, compatible with the proper care and comfort of the sick. Surgeon Turner pitched a tent in the hospital-yard, and has been in constant attendance. At the outbreak of the epidemic I was absent, but returned immediately, and was unfortunately taken sick a few days after, and

confined to bed for several days. During this time the whole charge devolved upon Surgeon Turner. Assistant Surgeon George O. Allen, who has been attending to the duty on board ship, has been very attentive and zealous. Capt. C. R. P. Rodgers has visited the hospital almost daily, and his fearless exposure has had a most excellent effect in allaying anything like a panic among the crew."

Early in January, 1871, small-pox began to prevail on board the United States steamer Benicia, in Japanese waters. By March, 1871, sixteen cases, with four deaths, had occurred on board that vessel; two cases and no deaths on the Idaho; two cases and no deaths on board of a Russian man-of-war. In all twenty cases, with four deaths. Further details are wanting.

In addition to the cases of small-pox, the occurrence of which has already been mentioned with more or less detail, there are reported as having been treated at the various naval hospitals and navy-yards, during the period from 1845 to 1870, eighty-three cases, thirteen of which proved fatal. No details with regard to the origin of any of these cases are recorded.

In 1849, one case of small-pox occurred at the Washington Marine Barracks; again, in 1857, two cases occurred. No extension of the disease was occasioned in either instance. But one instance is recorded of the occurrence of small-pox at the Naval Academy, viz: in 1865, when one modified case occurred, without further extension of the disease. Whether this case was in the person of a midshipman or among the officers and men also attached to the Naval Academy does not appear. The almost complete exemption, for so long a period, of so large a body of men and boys as that which has composed the force at this station, is a fact worthy of note.

The occasions upon which small-pox has prevailed to any extent on board the various receiving-ships of the Navy have already been mentioned. In addition to these, in fifteen distinct

instances has this disease been introduced into this class of vessels. Of these, in nine instances, not a single additional case occurred, and in the remaining six, in each but one additional case occurred. None of these cases resulted fatally.

During these twenty-six years, in addition to the occasions upon which small-pox prevailed in an epidemic form to a more or less aggravated extent, as already detailed, on board sea-going vessels, in ninety-eight distinct instances was it introduced on board such vessels, in none of which did its diffusion to any extent take place. In sixty-five instances, not a single case, in addition to the original one, occurred; in twenty instances, only one; and in ten, two additional occurred, without further spread. In three instances there were three additional cases developed; this was the utmost extension of the disease in any of the ninety-eight instances under examination.

In an examination of these cases of small-pox, which have been thus presented with all the detail possible, notice is attracted by the increased frequency of the occurrence of this disease in the United States Navy beyond that experienced among other bodies of men likewise presumably protected by vaccination. The regulations of the naval service of the United States, both previous to and during the period under consideration, have required that every recruit, when accepted by the examining-surgeon, should be immediately vaccinated. In addition, it has been required that, whenever a vessel shall have been placed in commission for sea-service, as soon as practicable, its crew should be examined by the medical officer, and that all should be then vaccinated who might still be found to require it. As the result of the faithful execution of these regulations, there would be found in the Navy not only a completely vaccinated population, but also one thoroughly revaccinated, inasmuch as, with but very few exceptions, all recruits, when shipped, have either already been vaccinated at some previous time or have already suffered from attacks of small-pox.

Despite the protection presumed to have been conferred through the measures indicated, it appears that in the United States Navy, in an aggregate force of 342,946 men, during the twenty-one years from 1850 to 1870, inclusive, there occurred 1,481 cases of small-pox, 135 of which resulted fatally, being a proportion of 431.85 cases and 39.36 deaths to every 100,000 men composing the naval force. In the British navy, during the fourteen years from 1830 to 1843, inclusive, among 363,370 men, composing the aggregate naval force, all being presumably protected by vaccination or by previous attacks of small-pox, there occurred 417 cases of small-pox, 36 of which resulted fatally, being a proportion of 115 cases and 10 deaths to every 100,000 men.* During the nine years from 1856 to 1864, inclusive, in the same service, among 482,615 men, composing the aggregate force, there were 1,597 cases of small-pox, with 139 deaths, or 331 cases, with 28.8 deaths, to every 100,000 men.† In the British army, for a period of ten years, as regards the troops at home, and for thirty years, as regards those in the colonies, there occurred, among every 100,000 men composing the aggregate force, 66 cases of small-pox, with 8 deaths.‡ During the nine years from 1856 to 1864, inclusive, the proportion was 161 cases and 15.5 deaths to every 100,000 men in the same service.§

The figures are better compared when arranged in tabular form, thus:

Service.	Period.	Per 100,000 men.	
		Cases.	Deaths.
United States Navy	1850 to 1870	431.85	39.36
British navy	1830 to 1843	115	10
Do	1856 to 1864	331	28.8
British army	Prior to 1846	66	8
Do	1856 to 1864	161	15.5

*Balfour, Medical-Chirurgical Transactions, vol. 35.

† Seaton, Handbook of Vaccination, App. I, Tables F and G.

‡ Balfour, Medical-Chirurgical Transactions, vol. 35.

§ Seaton, Handbook of Vaccination, App. I, Tables F and G.

Again, in the Prussian army, during a period of twenty years prior to 1855, there occurred but two deaths annually from small-pox.

In the Bavarian army, from 1843 to 1857, inclusive, there occurred neither a single death nor even a single case of unmodified small-pox. For the twenty-one years preceding 1868 the Danish army, and, for thirteen years, the Danish navy, almost entirely escaped contagion during several epidemics of small-pox.* These instances which have been adduced of large bodies of men which have been nearly exempt from the disease for a series of years are, all of them, examples of thorough vaccination. In the Prussian army, during the ten years previous to 1831, cases of post-vaccinal small-pox were increasing in number and fatality; hundreds of the soldiers were attacked every year; and within the three years 1831 to 1833 there had occurred no fewer than three hundred and twelve deaths by small-pox. Thorough vaccination having been enforced, the mortality was at once reduced from one hundred and four to two annual deaths. Note the experience, on this point, of the Würtemburg army, in which, during the five years 1833 to 1837, though small-pox infection had sixteen times been imported into different regiments of the army, there had ensued, among the 14,384 vaccinated soldiers, only in the person of one whose vaccination two years before had been followed by modified success, a single instance of varioloid.†

The value of vaccination to confirm and increase the protective power of primary vaccination, so as to reduce to an infinitesimal degree liability to small-pox, has been abundantly established by the experience which has been accumulating to the present time. Important recent testimony upon this point

* J. P. Loines, report on vaccination; report of Metropolitan Board of Health, 1868.

† See report of Dr. Loines, before referred to.

is given by Dr. Elisha Harris in the Memoirs of the United States Sanitary Commission, medical, p. 141. He states that "Wherever, in the late war, the regiments were effectually vaccinated, under military orders, or by the voluntary efforts of the surgeons, all the men submitting to the same process, regardless of previous vaccination, such soldiers successfully resisted the variolous infection, however much they were exposed to it."

Of the same tenor is the statement of Dr. Moreau Morris, sanitary inspector, New York City, contained in a report made by him to the board of health of that city in November, 1871, that of over ninety-nine thousand persons who were vaccinated by the officers of the health department during the months from March to October of that year, not one had been reported to that bureau as having had an attack of small-pox or varioloid, although during that year, as well as the following, small-pox was unusually prevalent in the city of New York.

A report of a committee of the French Academy of Medicine to the minister of the interior, quoted in the Amer. Jour. Med. Sciences, October, 1870, from the Revue de Therapeutique Med. Chirurg., July 15, 1870, contains the following: "The latest statistics, particularly those from the civil hospitals of Paris during the recent epidemic of small-pox, prove most positively that very few vaccinated persons are attacked with small-pox, and that of those who were none died."

The facts thus briefly alluded to are of great importance in their bearing upon the reasons for the comparative prevalence of small-pox in the United States Navy. The inference resulting from their consideration is clear, that there must be a radical defect in the vaccinations or revaccinations upon which our naval force has depended for protection. This conclusion is further confirmed by the results of these vaccinations, as officially reported. Of 5,114 vaccinations performed in the United

States Navy in 1867, 1869, and 1870, the records of which were forwarded to the Bureau of Medicine and Surgery, in only 133 instances was a successful result secured. In 4,981 instances the operation was unsuccessful. Of the 133 successful results, 43 were obtained out of 129 vaccinations performed on board three vessels, which, as exceptional instances, being deducted, leave but 90 to 4,985 as the ratio of successful vaccinations in the service at large. Inasmuch as the instances are very rare in which recruits have not been vaccinated, or else have had attacks of small-pox at some time previous to enlistment, the vaccinations received by them in the service are revaccinations, and as such will be accordingly considered. The experience of the large armies of Europe has shown, as the result of hundreds of thousands of experiments, that an average of from 30 to 40 per cent. of successful results will be obtained in any number of careful, thorough vaccinations; while in as many more instances some result, but of a modified character, will ensue; and in less than one-third total failures result. It being established that less than 33 per cent. is the proportion of failures that should result in a series of vaccinations, the fact that more than 98 per cent. of the revaccinations under examination should have been failures confirms the conclusion before stated, that *there has been a radical defect in the vaccinations upon which our naval force has depended for protection.*

The amount of damage suffered by the service from small-pox is difficult of computation. More than 2 per cent. of the deaths from all causes, the casualties of war included, have been from this disease.

Were it practicable to determine the number of days' work lost to the Government in the cases of the sick; the number of days' labor lost in the cases of those necessarily detailed from other duties to assist in the care of the sick; the expense of the treatment and subsistence of the sick; the burial expenses of

those deceased; the amount of pensions paid, resulting from deaths or disabilities incurred in line of duty, there would remain yet an element of detriment, not to be defined or computed, but equaling, if not surpassing, all else, viz, the inevitable demoralization, to a greater or less extent, of every ship's company among which the disease may prevail to any extent.

With regard to only one of the points mentioned, viz, the expense of the treatment and subsistence of the sick, has definite information been possible, though only to a limited extent in that particular. Expense incurred for one case upon the U. S. S. Michigan, in 1868, $93.05; 9 cases on the Iroquois, 1868, $260.98; 17 cases on the Oneida, 1868, $495.12; 12 cases on the Monocacy, 1869, $282; 61 cases on the Franklin, 1870, $2,433.42; maintenance of the temporary small-pox hospital at Yokohama, Japan, for the treatment of 16 cases from the Benicia, 2 from the Idaho, and 2 from a Russian man-of-war, 20 in all, in 1870 and 1871, $1,001. Summary: 120 cases, $4,565.57; or an average of $38.04 for each case.

It is not impossible that the expenses incurred in the cases enumerated were exceptionally great; judging from them, however, it is safe to assume that $30 per case would not exceed the average. Accepting this as the average, there would result the sum of $48,900, as a single item, and that one of the least, in the account of damages received by the service, within twenty-six years, through the prevalence of small-pox.

That the vaccinations within the Navy should have been so defective and ineffectual, as the facts given make it appear, depends upon a combination of influences. The experience of Fleet-Surgeon Sharp, as stated in his account of the epidemic which prevailed on board the U. S. S. Columbia in 1853 and 1854, that "it is difficult to effect vaccination on sea-going ships," repeatedly confirmed, as it has apparently been, in the experience of other surgeons, has led to the prevalence of an

opinion that there was something in the influences of ship-life incompatible with the full and normal development of the vaccine impression. Assistant Surgeon E. R. Squibb, in his account of the cruise of the Cumberland, before referred to, after stating that the results of the vaccinations which had been performed on board that vessel had been only one or two equivocal pustules, gives expression to his opinion thus: "It has been remarked by surgeons of experience and observation that vaccination does not succeed as certainly, or progress as regularly, on board of ships as under the ordinary circumstances!" Nevertheless, there appears no satisfactory foundation for this belief. The most superficial examination into the circumstances attending the uniform want of success of vaccinations performed on board ship will be sufficient to demonstrate that it is due not to any peculiar influence of ship-life, but in every case to the violation of some of the fundamental principles of efficient vaccination.

That thorough vaccination is as reliable and powerful in its results among those who are subjected to the influences of ship-life, witness the experience of the New York quarantine authorities, as detailed by Dr. Loines in the report on vaccination before referred to; among more than 80,000 persons, distributed among 160 vessels, during a period of twelve years, the exposure of the most of whom from the sick and dying of small-pox in the steerage had been of the most thorough kind, in no instance did they fail to arrest the disease completely, within one week after the arrival of the ship in port, by universal, thorough vaccination. The Navy of the United States has failed to receive the greatest amount of protection against small-pox attainable: 1st. *Because many of its medical officers have failed to appreciate the importance and necessity of revaccination.* The value of revaccination, in general, has already been discussed. Its special importance and necessity in the

naval service is apparent upon consideration of the circumstances peculiar to that service. The circumstances of ship-life are such as to be highly favorable to the spreading and intensifying of any contagious disease once imported on board.

As regards small-pox, a new element of danger is introduced in the influence which change of climate has to increase susceptibility to this disease in persons protected by previous vaccination.

Says Seaton: "The protection which vaccination gives against small-pox is seen in all races of mankind, and in all climates, but *change* from one climate to another, when that change involves considerable variation of temperature, would seem to render vaccinated persons, in many instances, more susceptible of small-pox."*

Says Dr. Dudgeon, in the eighth annual report of the Peking Hospital, in connection with the London Missionary Society: "It is not uncommon for Europeans to be attacked with small-pox on first reaching China. All would do well to have themselves revaccinated immediately before coming to China."

Add to this increased susceptibility to the disease, and to the highly favorable conditions for its spread existing on board ship, the fact that the localities most frequented by the sailor ashore are those most apt to be infected with contagion, and there is assembled a group of conditions, to meet which the most thorough measures should be adopted.

The presence of a single imperfectly protected individual in a large body of men, necessarily crowded together in a very limited space, where isolation, even in the most favorable circumstances, can only be most imperfect, imposes a great risk upon the community in which he moves. It is a demonstrated fact that the protective influence of even the most perfect primary vaccination in an undetermined proportion of cases will become

* Hand book of Vaccination, p. 230.

more or less exhausted. Exposure to contagion can alone determine whether such exhaustion has taken place in any individual case or not. Only by successful revaccination can the effect of the primary vaccination be confirmed and increased. Neglect in this respect, upon the entrance of recruits, results in the introduction into the service of large numbers, any one of whom may serve as the starting-point of a devastating epidemic, the imperfectly protected man, though enjoying partial immunity himself, being, nevertheless, as dangerous to his shipmates as if he had never been vaccinated at all.

Notwithstanding these considerations, it is not an infrequent practice with some medical officers to vaccinate those recruits only who present no evidence of previous vaccination. Thus, during the year 1870, at one of the most important recruiting-stations in the service, this practice obtained, under the direction of the senior medical officer, a medical director. At this station, during the year, there were forty-five recruits who presented no evidence of previous vaccination, (so reported,) and who were vaccinated. In only one case, however, was a good result obtained.

From the practice of which this is an example, it has resulted that no attempt has ever been made even to confer upon a portion of the naval force the added protection to be derived from revaccination. In those cases, however, in which universal vaccination has been attempted, a want of appreciation of its importance has given rise to carelessness in the performance of the operation and in the selection of the virus used. The usual want of success in vaccinations thus performed has tended to strengthen an opinion of the uselessness of the practice, and to promote its observance only as a mere form, required by regulations certainly, and, therefore, not to be neglected, but to be gotten over with as little trouble as possible, without any attention to those niceties and cautions in its performance which so greatly influence success.

The frequent delegation of the whole duty of vaccinating to incompetent and irresponsible apothecaries is another evidence of the want of appreciation of its importance upon the part of some medical officers.

The Navy of the United States has failed to receive the benefits of revaccination, secondly, *from the inferior character of the vaccine virus employed*, either inferior in kind or rendered inferior by deterioration before using from various causes.

The kind of matter in general use has been the scab or crust. A recent crust, mahogany-colored, semi-transparent, countersunk, presents a mode of transmitting vaccine lymph convenient, and to a good degree reliable. The concrete lymph, forming a mass of some thickness, inclosed within a delicate cuticular envelope, resists the tendency to rapid deterioration, through the decomposition to which all animal matter is prone, much longer than would the thin film of dried lymph, with which ivory, or quill "points" are charged. Carefully wrapped in oiled paper and in tin-foil, or inclosed within a coating of wax, it will retain its activity some time longer than it otherwise would.

In addition, this form of lymph, as found in the market, is comparatively cheap, ordinary crusts averaging in price only about one dollar each, while one is sufficient for the vaccination of from ten to fifteen individuals. These facts have determined its employment not only in the Navy, but generally throughout the United States.

The crust which most frequently results from a vaccination, however, is not the typical concrete vesicle which has been described. It is a mixture of dried lymph, blood, and pus; it has been divested of more or less of its cuticular envelope; it is prone to deterioration; it affords a vehicle for the transmission of other poisons than that of vaccina; it is very unreliable in its effects. To the use of such *quasi* vaccine matter as

this is due beyond question, in great measure, the large amount of inefficient vaccination which late epidemics of small-pox prove to have existed in this country. But even if the crusts issued for use in the Navy have been of good quality and in good condition, and possessed of virtue when issued from the naval laboratory, by the time that they reach their destinations and are produced for use, they will have often been placed in such conditions, and so much time will have elapsed, as to make them perfectly worthless. Issued at the beginning of a quarter, they are often kept for use throughout the whole three months following, and that, too, in places both warm and moist. Issued to a vessel with its outfit, it may be kept on board months, perhaps will have half circumnavigated the globe before being used. As an instance exemplifying some of the points mentioned, I adduce the case of a vessel which returned to New York in the spring of 1871 after a short cruise in the West Indies. At that time small-pox was quite prevalent, both in New York and Brooklyn, and it was deemed advisable that a general vaccination of the ship's company should be performed. Three hundred and twelve vaccinations were done. Crusts which had been received from the naval laboratory the first of January preceding, which had been taken in the vessel to the West Indies, remaining there some two months and again brought back to New York, were used, more than four months after having been received. Not a single successful result was obtained. It would have been strange had there been any. These vaccinations were performed by the apothecary, notwithstanding there were three medical officers attached to the ship at the time.

The facts which have been thus far stated are abundantly sufficient to explain how it has been possible that more than four hundred and thirty-one cases of small-pox should have occurred among every one hundred thousand men of our naval

force, as well as that less than 2 per cent. of the vaccinations on record should have been successful. What has been said, however, is of little value, unless it awakens the medical officers of the Navy to a realization of the necessity of thorough revaccination, and of the all-importance of carefulness in attending to the precautions necessary to success in its performance. I quote from Seaton :*

"In revaccinating, if revaccination is to be anything more than a deception and a sham, the same care must be used and as much pains taken to insure success as in performing a primary vaccination. * * * Persons in whom revaccination has so far taken as to give clear evidence that the lymph was absorbed (for it is in only a minority of operations that the same degree of success as attends a primary vaccination is attained) may feel themselves perfectly safe, that is to say, as safe as any human proceeding can make them, against future small-pox. The repetition of revaccination every five or seven years, or at whatever other intervals people may choose arbitrarily to fix, or whenever they get frightened because an epidemic of small-pox is about, is mere trifling, a practice unsupported by reason or by observation. One thoroughly good primary vaccination to start with, and one careful revaccination after puberty, so conducted as to give evidence that the lymph was absorbed, are all that is necessary for complete protection—protection as complete as any known proceedings can give—against small-pox."

A recruit should receive this thorough revaccination at once upon entering the service. No more important duty devolves upon the examining-surgeon of a rendezvous or the surgeon of a receiving-ship than the one in question. The elements of success are few, and always to be obtained in the great cities, where the recruiting-service is carried on, viz, lymph pure and

* Handbook of Vaccination, p. 275.

fresh, and sufficient thoroughness in the inoculation to insure its absorption.

At our more important recruiting-stations, in New York, Boston, and Philadelphia, daily supplies, even, of fresh lymph are to be obtained, if needed. Under no circumstances should lymph more than a week old be used. Should the present quarterly supply of scabs be abandoned, and, instead, each recruiting-station arrange for a direct supply, at least as often as once a week, of freshly-charged quill or ivory points, or of capillary tubes, a most important reform would be effected. During the winter and spring of 1872 such an arrangement was carried out on board the receiving-ship Vermont, at New York. On board this vessel, during the two years from April 1, 1869, to March 31, 1871, there had been 3,997 vaccinations performed, from which not a single successful result is known to have been obtained. From January 1, 1872, to March 31, 1872, there were 988 vaccinations performed with lymph procured as above described; of these, 718 were reported as successful, more than 72 per cent. of the whole number. It would seem that no attempt at distinction into perfect and modified results was made in this report, but that all which responded in any degree to the inoculations performed were classed, and properly, as successful. One case of variola, which terminated fatally, occurred at this time, in the person of a man who had just been transferred from the receiving-ship to another vessel, and who, it was found, had managed to dodge the vaccinations in progress on board the former vessel. During the year 1871, I myself performed 336 revaccinations at the Marine Barracks, New York. Care was taken to secure good virus. Of these, 191 returned perfect results, 45 modified results, and but 100, less than one-third, failed entirely. Such results as these, harmonizing as they do with the statistics of the more extensive revaccinations referred to earlier in this paper, ought to be the common

experience in the service. Revaccination of all recruits having been thoroughly performed at the various recruiting-stations, no necessity would exist for its repetition afterward on board ship. In those occasional instances only in which men are shipped by the officers of a vessel directly, as in foreign ports, would the duty of vaccination devolve upon the medical officers of a vessel. Such vaccinations ought to be as conscientiously and thoroughly performed as any others. For this purpose it is required that there should be furnished to vessels abroad a supply of lymph preserved in such manner as should avoid, as far as possible, its tendency to decomposition, and as should warrant its purity.

Fleet-Surgeon W. Whelan, under date of Naples, August 15, 1850, in his report of the epidemic of small-pox which had prevailed on board the United States Frigate Independence in the early part of that year, makes the following note with regard to the practice of vaccination at that place:

"Vaccination is in very general use. The virus is admirably preserved, and, if it be not practiced in the United States, a knowledge of the plan would prove the means of distributing a genuine article throughout the country, as well as in the Navy, in a shape that almost defies deterioration. The matter is introduced into capillary glass tubes, open at one end, and then hermetically sealed. When required for use one end of the tube is broken off, and the other held in the flame of a candle with a forceps, when the virus is discharged upon the point of a lancet. Dr. Clymer, of the St. Lawrence, informed me that he had repeated vaccination on sundry persons on board that ship two, three, and, in one or more instances four times, and in most of the cases a genuine pustule followed."

The mode of supplying lymph thus suggested to the Department by Dr. Whelan, more than twenty years ago, is worthy of more attention than it has received.

Says Dr. Seaton:* "For long storage, for preserving lymph that must be kept some time before it can be used, the balance of advantage seems to me altogether in favor of tubes. Great uncertainty attaches to the use of long-kept dry lymph, and frequent disappointment attends it, while to the length of time lymph may be kept in tubes there seems no limit. Mr. Ceely states that he witnessed the successful results of vaccinations from tubes that had been kept five and a quarter, six and a half, and seven and a quarter years. Lymph which has been kept longer than the longest of these periods has been used with perfect success. The two conditions which most interfere with the successful preservation of lymph in hot climates are heat and moisture. Tube-lymph has nothing to fear from moisture; by heat, tropical heat, it may be affected."

In three hundred and forty-one primary vaccinations, done by Dr. Husband, of Edinburgh, with lymph kept in tubes for different periods, varying from a day to two and a half years, the greater part of the lymph having also, for experiment' sake, been exposed for several hours daily to a temperature of from 80° to 90° Fahrenheit, the following results were obtained:

Length of time the lymph was kept.	No. of cases experimented on.	Successful.	Failed.
Under one month	126	107	19
From one to six months	122	107	15
From six to thirty months	93	86	7
Total	341	300	41

The superior advantages of lymph thus stored commend it as the kind which should invariably be furnished for use on board the vessels of the Navy. Though somewhat more expensive than the scabs hitherto furnished, the additional expense is too trifling to be worthy of a moment's consideration in view of the interests at stake. Their use would be in the interest of

* Handbook of Vaccination, p. 152.

true economy, as shown by the amount of damage incurred by the service hitherto from the use of a worthless article.

There is a choice to be exercised in the selection of tubes charged with lymph. If the tubes are too short, or too much of their canal occupied by the column of lymph, there is danger that the heat required in sealing them will have injuriously affected the lymph; while if they are sealed by wax or other similar material, a method employed both in Europe and in this country, the air is not sufficiently excluded, and the lymph soon spoils. A tube should be not less than three inches in length, nor should more than from one-half to three-quarters of an inch of the central part of its canal be occupied by lymph. With these precautions its ends may be hermetically sealed without danger of injury to the contained lymph from the heat required. In using them both ends should be broken off, and the lymph gently *blown out* upon the point of a lancet. The method of expelling it described by Dr. Whelan should be avoided, on account of the danger of injury from the heat employed. A tube of the kind described will contain enough lymph to make three to five thorough inoculations, which should be made by preference upon abraded surfaces of some extent, to insure the absorption of the lymph applied.

There remains yet for consideration the value of a mode of procedure which has been advocated as an expedient worthy of adoption in cases in which a necessity for immediate general vaccination is felt and the supply of reliable virus is small, viz, as many as possible of the healthiest men, having been vaccinated with the virus on hand, and successful results having been obtained in some of them, the use of the lymph obtained from the vesicles thus developed for the further vaccination of the remainder of the ship's company; in other words, the use of secondary lymph in revaccination. The following two instances of this practice are quoted from the statistical reports of the health of the British navy:

In the first quarter of 1862, an epidemic of small-pox prevailed on board Her Britannic Majesty's ship Mars, at the Piræus, Greece. There were in all fifteen cases and one death. Fresh vaccine-lymph was procured from Athens. Fifty officers and men were revaccinated, with four successful results. From these, two hundred more of the ship's company were revaccinated, with only one successful result. Altogether four hundred persons were revaccinated, with five successful results.* Again, in May, 1865, the surgeon of Her Britannic Majesty's ship Princess Royal took four of the healthiest of the ship's company to the house of a Chinese at Singapore, and from a child vaccinated both arms of each man, and in due time from these all the wardroom and gun-room-officers, as well as the doubtful cases among the ship's company. Every man who did not present unmistakable evidences of previous vaccination was subjected to the operation, so that it was certain that every man in the ship had been vaccinated.† The success attending these vaccinations is not reported, but the want of protection derived from them is illustrated by the fact that, but a short time after, a very virulent epidemic of small-pox broke out on board this vessel, nor ceased till after one hundred and fifty cases had occurred. These experiences are not calculated to inspire confidence in the value of this expedient. The results obtained, in the case of the Mars at least, do not, however, I believe, fairly represent the amount of success to be expected from the use of carefully selected secondary lymph. The following experiments on this point are submitted for consideration.

Out of a considerable number of successful revaccinations performed on the troops at the Marine Barracks, Brooklyn, N. Y., in 1871, I selected three healthy men as sources of lymph for further vaccinations. All presented good scars of previous

* Report for 1862, p. 47. † Report for 1866, p. 305.

vaccinations in childhood; none had ever been revaccinated. From the first two cases I took the crusts which had formed and were detached about the 14th day. With these two crusts, 28 vaccinations were done, of which 27 failed entirely, and in 1 only was a partial or modified result produced. From the third case I vaccinated with lymph, directly from arm to arm, one man, who also presented distinct scars of a vaccination received in infancy. A perfect result was developed. With lymph obtained from this man I vaccinated 32 others. Of these, 9 developed perfect vesicles, 8 modified vesicles, and 15 failed entirely. From the 9 perfect vesicles I selected 2 with which to continue the vaccinations. The first had suffered an attack of small-pox in childhood, and had never been successfully vaccinated before this time; with lymph furnished by him, 12 were vaccinated, with 6 successful results and 6 failures. From the second, vaccinated in infancy, the scars distinct, never before revaccinated, 10 vaccinations were done, 6 perfect vesicles, 1 modified, and 3 failures resulting. From these last perfect vesicles, three again were selected. From the first two, 20 vaccinations were done, with 13 perfect, 3 modified vesicles, and 4 failures as the results. The third man had once before been successfully revaccinated, thirteen years before, and presented distinct marks of both the primary and the secondary vaccination. He was this time vaccinated in both arms, in one primary lymph, and in the other secondary lymph, being inserted. Both developed fine, large, plump umbilicated vesicles, from which, upon puncture, the lymph flowed freely, having but little viscidity. Thirteen vaccinations were done with this lymph, all of which failed entirely. From the 13 successful cases resulting from the first two of this set, 4 were selected for further use, and from them 32 vaccinations were done. Thirteen perfect, 3 modified vesicles, and 16 failures were the results obtained. Four from this set again being selected, 11 vaccinations were done

with the lymph obtained, which resulted in a perfect vesicle in 1 instance, in a modified vesicle in 1 instance, and in failure in 9 instances. In making a summary of the results thus detailed, the 28 vaccinations in which crusts were used and the 13 performed with the copious serous lymph described may be eliminated. They are of value, however, as illustrating the kind of lymph that ought not to be used; and also the necessity of care in the selection of lymph upon the efficacy of which any reliance is to be placed. It is evident that the matter in question was inert. The most of the cases were afterwards again vaccinated with secondary lymph, at various points in the series described, and many of them developed successful results. Having deducted these 41 cases, there remain 118 as the total of the revaccinations performed with carefully selected secondary lymph, of which 49 resulted in perfect vesicles, 16 in modified vesicles, and 53, less than one-half, failed entirely. The following table presents the details of these cases in a condensed form:

Revaccinations with secondary lymph.

Removes from primary stock.		1	2	3	4	5	6	Totals.
Number vaccinated		1	32	22	20	32	11	118
Results	Perfect	1	9	12	13	13	1	49
	Modified	....	8	1	3	3	1	16
	Failures	....	15	9	4	16	9	53

These results, judging from the amount and character of the local disease developed, indicate a degree of virtue in secondary lymph, when properly selected, but little inferior to that belonging to primary lymph. Whether the same amount of immunity against small-pox is conferred by it or not remains to be established.

In concluding this inquiry, it is of interest to remark the information which can be gleaned from naval experience as to

the proportion of those who, having been vaccinated in infancy, will, when they shall have reached adult age, re-acquire susceptibility to variolous infection. The opinion is generally prevalent, nor is it confined to non-professional people alone, that the results of revaccination are reliable as an indication of what the constitutional condition of the revaccinated person was with reference to his or her susceptibility to variolous infection at the time. It has been seen, however, that of revaccinations thoroughly performed, less than one-third fail to develop results more or less perfect in their character. That so large a proportion of the vaccinated should lose their immunity against small-pox is contrary to all experience. The persistence and the amount of the protection conferred by primary vaccination are most clearly exemplified by the repeated instances in which its introduction on board vessels of the Navy has not been followed by any extension of the disease. As an excellent example of the extent of the exposure which ensued in many of these instances, note the following account, furnished by Surgeon Delavan Bloodgood: "In the year 1858, while the United States frigate Merrimack, with a ship's company of between five and six hundred men, was at Callao, a man returned from liberty at night, and slung his hammock *among the crew on the berth-deck;* the next morning he was found *broken out with small-pox*, and was sent, with his clothing and bedding, to a hospital at Bella Vista, (a few miles from town.) Not another case occurred. We had no virus, excepting that which had been furnished with outfit in the United States two years before, and which had been subjected to a tropical temperature for many months. The crew had been vaccinated after sailing from the United States, and before reaching Rio de Janeiro, but I do not remember that it was successful in a single instance." Recall in this connection the fact, before stated, that during the twenty-six years which have been under exam-

ination, on board the various receiving-ships and sea-going vessels of the Navy, in eighty distinct instances, of which the case above cited was one, was small-pox introduced without its extension in a single instance beyond the original case; and that in twenty-six more instances was it introduced, and but one additional case was caused; and a most gratifying demonstration of the power of primary vaccination is established. The conclusion is certainly fair from such experience as this that the opinion which would assert that of adults who had been vaccinated in infancy, two-thirds had lost to a greater or less degree the protection then acquired is incorrect.

The truth remains, however, that some do lose this protection; how large a proportion, can only be ascertained by the exposure of large numbers to contagion, this being the only test of any value. We find that this test has been applied on a large scale in the Navy. Such are the circumstances of ship-life, that it would be impossible for small-pox to prevail to any extent upon a vessel for any length of time without the thorough exposure of every person on board to the contagion. Probably it would be impossible to put the protective power of vaccination to a severer test than that to which it is subjected during an epidemic of small-pox on board a naval vessel; the difficulty of effecting thorough ventilation; the large number of men crowded together in narrow quarters; the impossibility of isolating the sick; the necessity upon the part of the well of constantly breathing a variolated atmosphere; the lowered state of vitality of the ship's company in general, resulting from ship-life; in many instances, the constitutional disturbance incident to change of climate; all these combine to intensify and prolong the disease, when once established.

The number who, in such circumstances, are attacked by the disease, when it is allowed to expend itself unchecked by successful revaccination, may certainly be assumed as represent-

ing the maximum proportion of vaccinated adults who are capable of infection. Were it possible also to ascertain how thorough had been the original vaccinations in the case of every one thus exposed, the results would be still more valuable and interesting. As it is, the figures will exhibit a liability to post-vaccinal small-pox really greater than does exist among the well vaccinated, for among the so-called vaccinated persons, upon whom a calculation may be based, there will be all degrees of thoroughness in the vaccinations they may have undergone.

Of the various epidemics which have been previously detailed, the following fourteen afford sufficient data for this calculation; in none of them is there any evidence of successful revaccinations having been effected, save in the case of the United States Steamer Franklin, in 1870, on board of which vessel a limited number of successful revaccinations were effected, but the number was not great enough to materially affect the result:

Year.	Vessel.	Cases.	Deaths.	Ship's company.
1845	Columbia	69	4	496
1850	Independence	116	7	560
1850	Cumberland	62	4	453
1853	Columbia	16	0	460
1857	Levant	28	5	166
1863	Dacotah	41	3	162
1864	Jamestown	31	4	214
1864	Juniata	20	0	237
1868	Iroquois	15	3	179
1868	Oneida	17	6	173
1869	Jamestown	27	1	194
1869	Monocacy	12	0	117
1870	Franklin	61	5	597
1870–71	Benicia	21	4	270
Totals		535	46	4,278

Among 4,278 men, presumptively protected by primary vaccinations, or in a small proportion of cases by previous attacks of small-pox, all of whom must have been exposed to contagion, 535 cases of small-pox were developed, with 46 deaths, being a

proportion of 12½ per cent. of the whole. This proportion, 12½ per cent., the result of the specially unfavorable circumstances described, certainly represents at its worst the dangers to the vaccinated. This result is sufficient to warrant the important conclusion that, *of those who have been vaccinated with any degree of thoroughness in early life, less than* 15 *per cent. ever re-acquire any susceptibility to variolous infection.*

REPORT ON VACCINA AND VARIOLA.

By THEORON WOOLVERTON, M. D.,

SURGEON U. S. NAVY.

The somewhat remarkable results obtained on board the United States Steamer Shenandoah from revaccination, and a recent anxious experience with small-pox, having particularly directed my attention to these subjects, I have thought that an account of the same might not be uninteresting.

The principal object of this paper is, however, to suggest a more rigid and satisfactory system of revaccination in the Navy, as it is believed that the operation as at present performed does not afford the best attainable results. The importance of vaccination is much more fully recognized in Europe, and especially in England, than with us.

I shall give a *résumé* of the more important facts contained in the standard authorities. The substance of the following paper is collated from Seaton's Handbook of Vaccination; Marson's article on "Variola" in Reynolds's System of Medicine, vol. 1; and the interesting little work, La variole au point de vue épidémiologique et prophylactique, par Léon Colin, médecin principal de l'armée, &c., Ballière et Fils, Paris, 1873; other sources will be indicated.

Cow-pox can only be communicated to the human subject by inoculation of the specific virus of the disease, and is most conveniently and surely made in the way discovered by Jenner, from a human being, who is at the time the subject of the infection.

The phenomena of primary and secondary vaccinations generally differ, and must be described separately. The progress of vaccination may be retarded frequently by a delay of a day or two in the formation of the characteristic vesicle, and occurs much more frequently when dry lymph is used. This delay does not impair its protective value, provided only the phenomena be regular in their character.

The incubation of certain diseases, as measles and scarlatina, may retard the result. The course of cow-pox should be well watched, and no warrant of protection given, unless a regular areola has been developed. In small-pox, if the incubation of the disease manifests itself within two or three days of the vaccination, no vaccine vesicles will rise, only small-pox will be developed; if the disease be less advanced, and the cow-pox has taken local effect before the small-pox symptoms set in, the further progress of vaccina may or may not be retarded; very frequently the diseases will be seen going on together so distinctly that lymph from the cow-pox vesicle will certainly produce cow-pox, and lymph from the small-pox vesicles small-pox. If, however, the vesicles had not reached the stage of areola before the small-pox set in, no influence will be produced in the course of the small-pox; if, on the other hand, the areola be fully formed around the cow-pox vesicles before the small-pox symptoms appear, the vaccination will, according to its date, arrest the small-pox at its premonitory stage, or alter and modify the course of the eruption. A hastened course of the cow-pox vesicle, unless it be a simple acceleration for twelve or twenty-four hours, is to be regarded with greater suspicion, as spurious vaccination is usually accelerated.

There are varieties of spurious cow-pox. In the form most frequently seen the course resembles revaccination; the vesicle begins with itching and irritation; it is acuminated and conoidal instead of being flat and umbilicated; the lymph is opaque.

Sometimes the vesicles, by the eighth day, have burst, and become scabby and pustulous or open sores. The practical point is, that a vaccination, presenting any deviation from the perfect character of the vesicle and the regular development of the areola, is not to be relied on as protective against small-pox. Spurious vaccination may usually be traced either to the use of spoiled lymph or to something amiss in the subject vaccinated, as herpes, intertrigo, &c. Jenner states that a very small herpetic patch will often vitiate the result. Whenever there has been any irregularity revaccination should be performed. Lymph taken from revaccination cases, from spurious vesicles, or from normal primary vesicles, if taken at too late a period, may give rise to serious local results. If practicable, vaccination is best performed in cool weather.

In the majority of persons the regular phenomena of vaccination can be produced but once in a life-time, any subsequent introduction of lymph either failing to produce any local effect, or, much more commonly, a modified result. Except for pressing reasons, persons should only be vaccinated when they are in good health; they should be free from any acute disease, or from any chronic disease known to interfere with the regular course of the vesicle.

The diseases which most decidedly contra-indicate vaccination are, besides acute febrile diseases, diarrhœa and cutaneous diseases, particularly those of the vesicular type. Jenner's rule was to sweep away all eruptions from the skin previous to inserting the vaccine lymph. Only an acute febrile disease of a serious character would, however, sufficiently contra-indicate vaccination if the risk from small-pox should be immediate. When the disease breaks out in a house or family where there are persons of any age whatever unvaccinated, or not otherwise protected, all such persons should be at once vaccinated without any delay. As the incubative stage of variola is twelve

days, while the time requisite to bring vaccination to the stage of areola is only nine days, vaccination performed at any time within the first three days will reach the stage of areola soon enough to produce its protective power; after this, whatever the local success of the vaccination, no constitutional protection will be imparted.

Dr. Marson says: "Suppose an unvaccinated person to inhale the germ of a variola on a Monday; if he be vaccinated as late as the following Wednesday the vaccination will be in time to prevent small-pox being developed; if it be put off until Thursday the small-pox will appear, but will be modified; if the vaccination be delayed until Friday it will be of no use; it will not have had time to reach the stage of areola, the index of safety, before the illness of small-pox begins. This we have seen over and over again, and know it to be the exact statement of the question."

Safety cannot be promised unless the areola be completely formed.

The selection of lymph is of the greatest importance; it should only be taken from perfectly healthy subjects and from characteristic vesicles. Prime lymph is always perfectly limpid, and possesses a certain degree of viscidity. Thin serous lymph should always be rejected. The vesicle yields lymph of the best quality and in greatest abundance on the eighth day from the period of vaccination. It must be taken according to Jenner's "golden rule," before the appearance of the areola, or, at all events, within a few hours of its commencement. Lymph taken later does not take with anything like the same certainty, and is more apt to be followed by erysipelatous and spurious results.

Jenner's opinion as to the degree of protection afforded by vaccination is thus stated by him: "Duly and efficiently performed, it will protect the constitution from subsequent attacks

of the disease (variola) as much as the disease itself will; I never expected it to do more, and it will not, I believe, do less."

In order that persons should have from vaccination the fullest protection which it is capable of imparting, it is necessary that it should be not only perfect in character, but sufficient in amount; that the system should be not only infected, but well infected.

By observations of unsurpassable interest and value, made for upwards of thirty years at the Small-Pox Hospital, London, it has been demonstrated that the liability to contract small-pox, and its severity, is determined by the character and number of the cicatrices. Persons whose vaccination has resulted in their having one genuine vaccine vesicle, and one only, are, as a rule, much less protected than those who have had two; those who have had two, than those who have had three, &c.; and the protection against fatal small-pox which is afforded by four or more genuine vesicles is almost absolute.

The subjoined tables, giving results of Marson's observations in nearly 5,000 post-vaccinal cases, which occurred from 1836 to 1855, inclusive, will show at a glance the influence exercised on the course of small-pox by the character and number of the vaccine marks:

	Per cent. of deaths.
1. Unvaccinated	35.00
2. Stated to have been vaccinated but presenting no cicatrix	23.57
3. Vaccinated:	
(*a*) Having but one cicatrix	7.73
(*b*) Having two cicatrices	4.70
(*c*) Having three cicatrices	1.95
(*d*) Having four cicatrices	0.55
a. Having well-marked cicatrices	2.52
b. Having badly-marked cicatrices	8.82
4. Having previously had small-pox	19.00

It is in the classes which had only one or two cicatrices that the influence of the character of the cicatrix was most remark-

ably seen. In those who had one cicatrix only, if this cicatrix were thoroughly well marked, the death-rate per centum was 3.83, but among cases in which the single cicatrix was badly marked, the death rate was 11.91 per centum. And while among cases which had two well-marked cicatrices the death-rate per centum was 2.32, among cases which had two badly-marked cicatrices, the rate was 8.34.

Let an unvaccinated person contract small-pox and the chances are more than 1 in 3 he dies; but a very badly-vaccinated person, a person with one imperfect cicatrix, let him contract small-pox, and the chances are not quite 1 in 8 that he dies. Let a person with two good vaccine cicatrices have small-pox, his chances of dying are less than 1 in 40; but persons who have been vaccinated in the best and most complete way, will, if they ever get small-pox afterward, not die of it, at much more than 1 in 200; there is also to be considered the difference in the amount of suffering, and in the subsequent disfigurement.

The arbitrary assumption that vaccination holds good only for stated periods, as 7, 10, or 14 years, is not tenable, for if the influence leading to this result consisted in a mere wearing out of the protection by the lapse of time, it would be steadily progressive; and in observations of large masses of vaccinated populations at different ages, we should find the liability to small-pox becoming greater, the greater the age, or the longer the time that had elapsed since the performance of vaccination. But that this is not the case is shown by a long series of observations in the troops of the British army serving in the United Kingdom; and the great bulk of post-vaccinal small-pox cases admitted into the Small-Pox Hospital, London, is found to be between the ages of 15 and 25; after 25, there is a remarkable diminution. The annual deaths in the army were somewhat less than 1 in 10,000; in the navy 2 in 10,000, for the six years

1859–'64, inclusive, and the cases of variolous affections of any kind, 14 per 10,000 in the army, and 33 per 10,000 in the navy, the disease being in the great majority of cases exceedingly modified. The average death-rate for small-pox is scarcely one-tenth of what it was at the end of the last century.

The annual death-rate per million in England for 30 years before the introduction of vaccination had been estimated at 3,000; the average of the 12 years from 1854 to 1865, when vaccination was to a certain extent obligatory, was only 202 per million.

Revaccination aims at repairing whatever was irregular in primary vaccination, in supplying whatever was deficient in the amount of the infection when the course of the vaccination was regular, and of extinguishing the susceptibility to small-pox which may remain, or may have re-arisen in an indeterminable number of persons whose primary vaccinations may have been regular as well as complete. It should be performed about the period of puberty. After successful revaccination, small-pox, even of the most modified kind, is rarely met with. Heim found in five years, out of 14,384 revaccinated soldiers in Würtemburg, but 1 case of varioloid; and out of 30,000 cases in civil practice, but 2 cases, one of these doubtful.

In the Bavarian army, with compulsory revaccination, from 1843 to 1855, there was no case of variola.

Dr. Marson's experience at the Small-Pox Hospital is still more valuable; for over thirty years he has revaccinated all the nurses and servants who have entered that institution, before allowing them to commence their duties, and during that time not one of them has taken small-pox.

The same care should be used and as much pains be taken to insure success in revaccination as in performing a primary vaccination; the lymph should be of the very best. We must not expect the same degree of success as in primary vaccination, nor the same proportion of successful results.

If the operation should fail, it should be repeated at some future time; but to persons in whom the operation has succeeded, so far as to give clear evidence that the lymph was absorbed, as perfect safety against small-pox as any human proceeding can secure is secured them, and the repetition of revaccination at five or seven years, or at any arbitrary period afterward, is mere trifling, a practice unsupported by reason or by observation.

M. Colin gives some interesting details as to variola during the siege of Paris, and the spread of the disease which constituted the epidemic of 1870–'71. The following pages, freely translated, are from his work.

M. Bernier has said that no satisfactory explanation can be given for the extraordinary epidemical oscillations, for the excessive variability in the same localities at different times, under the influence of which permanent diseases, essentially contagious and transmissible, lose, for a time, their contagious properties and their transmissibility. This diminution, under certain unknown influences, is the more remarkable that in all seasons the affection rests inoculable to nearly the same degree, so that it is probable that the transmissibility is not solely due to the susceptibility of the organism, since this is not refractory to inoculation. Perhaps the cause may be sought in the modifications wrought upon the volatile contagion, the specific poison which engenders variola, by meteorological influences.

The conditions of race as influencing this disease are not known, but it may be said that there is no affection before which all men appear more completely equal; in no other disease does contagion play so absolute a rôle; and it is well known how grave and independent of all conditions of race certain epidemics following the introduction of the morbid germ among various savage people not vaccinated have been. It is probable, we think, that the recurrence of the epidemics are the re-

sults of the exhaustion of the immunity conferred upon the masses, numbering many or few, by a former epidemic, and, in consequence, of a morbid predisposition to a fresh attack.

In the epidemic of 1870–'71, it was from the departments of the west that the disease first developed; it has taken root in Brittany, because it found there that part of our population the most especially exposed from neglect of vaccination; then, from the fact of the rapid creation of armies at different points of French territory, the disease found for its development a considerable mass of subjects which there had not been time to revaccinate; thus the disease spread throughout France, and, by the movements of the war, penetrated Germany.

Germany suffered particularly from this epidemic, and from the same cause, the absence or insufficiency of vaccinal protection, which was thought to have been assured by the rigorous application of this hygienic law. The example of the city of Leipsic is, perhaps, the most striking illustration of the fact. In this city, of 106,922 souls, there had been but 681 cases and 29 deaths from variola in eighteen years; in fifteen months, from November, 1870, to February, 1872, there were admitted into the special hospital of Wünderlich 1,727 cases, and there were in the city 1,027 deaths; that is to say, 1 death for every 100 of the inhabitants, a mortality greater than that of the French army in Paris during the siege.

The most extraordinary feature of this mortality is its division, according to the age of the victims; thus, of the 1,027 deaths, 715 were below the age of fifteen, only 312 being adults.

How explain the gravity of this epidemic at Leipsic, particularly this frightful mortality of infants?

The reason for these facts, so grave and so exceptional, is given by the authorities themselves, Wünderlich and Thomas; the calumniators of vaccination may learn in them a great lesson. There had been at Leipsic for several years preceding a verita-

ble league constituted against vaccination, which, in the name of certain dogmas as false as obscure, had striven against the discovery of Jenner by every possible means—by the press, by clubs, by the formation of associations—and which had, in effect, attained the double result of preventing the primary vaccination of a great number of infants, and that of the revaccination of many adults.

The greater mortality of children in this epidemic may from this be understood; the majority of adults having been vaccinated in their infancy, before these objections to vaccination had become popular.

From official sources it appears that there were in Leipsic in 1868, vaccinations, 3,443; in 1869, 1,970; in 1870, 1,340.

This is what happened in a city of Germany, notwithstanding the example of the power of revaccination against small-pox, as shown in the Prussian army for twenty years; (during that time there had been in it but two deaths from this disease.)

The detractors of vaccination have intentionally refused to newly-born children that protection of vaccination to which, since Jenner, they have the right, as to a baptism, upon their entrance into life, and have thus devoted, in advance, a series of young generations as victims to the first epidemic of small-pox.

For the army during the siege of Paris the hospital of Bicêtre was used for the reception of small-pox patients. From October, 1870, to March, 1871, there were 7,578 admissions, with 1,074 deaths.

The *personnel* of the hospital was but slightly affected. Among forty physicians and apothecaries and forty nurses, Sisters, there was no case. M. Colin believes that there may be, up to a certain point, an acquired immunity by prolonged resistance in contact with variola. Of 460 soldiers stationed near Bicêtre, and revaccinated, but one entered the hospital,

more than twelve days after his inoculation, and that with mild varioloid. Of 120 nurses revaccinated under the observation of M. Colin, there was not a fatal case of the disease, notwithstanding their contant exposure. He combats the idea that the gravity of the disease is increased, in any individual case, from its having been contracted in an atmosphere saturated to its maximum with the variolous poison. He is of the opinion that the tendency to take small-pox increases in a direct ratio with age; that in those who are younger, even if not revaccinated, the influence of the primary vaccination counts for more—a point at which he is at variance with the English authorities, who find from statistics that the greatest number of post-vaccinal cases of variola occurs between the ages of 15 and 25. They agree, however, in the statement that the mortality from the disease below the age of 15 is very small. Of revaccination M. Colin writes: "There is but one disease of which the prophylaxis has been providentially given to man; to neglect that prophylaxis would be a crime of treason against humanity. Thanks to Jenner, variola has clearly emerged from the obscure class and the uncertain therapeutics of epidemic diseases, to constitute, of morbid types, the most accessible to human power."

It is essential to remind the public that the immunity conferred by revaccination only dates from ten to twelve days after inoculation if the operation should succeed; also that the more or less complete failure does not, by any means, authorize them in relying upon the immunity conferred by the first vaccination. These fruitless revaccinations should be renewed as frequently as possible, particularly in the time of an epidemic. If some persons escape the disease again and again, there is no constitution, no temperament which can be regarded as refractory to the development of the affection. We have seen with astonishment the opinion upheld that for individuals enfeebled

by an attendant disease primary vaccination more rapidly loses its virtue, so that feeble and ailing persons would be more especially disposed to take either variola or vaccina, and that among such only should revaccination be practised. If there could be a choice, and if we were not of the opinion that revaccination were necessary for all, we should say that it was especially so for the robust and sanguine, those who are particularly disposed to acute affections, as variola, fevers, &c. During the war of 1870-71, while the besieging Prussian army found itself between Paris, where the disease was epidemic, and the armies of the provinces, which were also infected, there were in it but few cases. According to official returns of the Prussian army during the war, the total loss by variola was but 263, not $\frac{1}{100}$ of the total loss, 49,987.

Among the few hundreds of prisoners in Paris but one was sent to Bicêtre, and his affection was so temporary that there was a doubt as to the diagnosis.

I had the pleasure to meet Dr. Marson in London a short time ago, and he informed me that in no manner had he changed his views as set forth in his article in Reynolds's system, though he had seen several thousand additional cases since it had been written. The percentage, as given there, continues nearly the same.

I believe that Dr. Marson regards the American as an ill-vaccinated nation.

In France vaccination is not compulsory, as in England, but it is very general.

In Switzerland, at least in the canton of Geneva, there is gratuitous vaccination provided for those who wish to avail themselves of it. It is not compulsory, as it would be considered inconsistent with their form of government—republican—as perhaps it would be thought with us, to enforce vaccination at any given early age, even if they were convinced, which

they often are not, that it would be for the children's good. But children are not allowed to enter public schools without having been vaccinated; and all recruits for the army are revaccinated.

In Spain, at Barcelona, I visited a gentleman who professed to vaccinate directly from the cow. He said that he had no trouble in continuing the disease from animal to animal, and that he never had any difficulty in inoculating children. I had no opportunity of verifying these extraordinary statements.

Dr. Visick, an English physician, resident at Malaga, informed me that vaccination is performed throughout Spain generally by barbers, who introduce the lymph from arm to arm by means of a grooved needle; and that the resulting vesicles are very small, but quite perfect in character. He thinks that small-pox is not so severe a disease in Spain as in more northern countries, and says that while all persons avoid with horror the vicinity of an invalid with consumption, and, after death, burn everything that has been used by such a one, they entertain no prejudice against small-pox, from which they scarcely turn aside. He also tells me that in Spain scarlatina hardly merits the name of a disease, so mild is it usually.

From the foregoing synopsis it will appear, I think, how much more attention is given to the performance of vaccination and revaccination generally in Europe than in the United States.

For the past few years there has been scarcely one of our vessels of war in Europe that has not at some time during her cruise been infected with variola.

The Franklin and Plymouth suffered severely; more recently the Wabash, Wachusett, and Shenandoah have had cases.

During the three years' cruise of the Shenandoah she has been infected three different times; fortunately, in no instance has the disease spread among the ship's company. Since July, 1871, there have been vaccinated on board this vessel, the Shenandoah, 351 persons. The lymph used has either been

taken directly from the arms of children, on ivory points, or, in the greater number of cases, the vaccination has been performed with liquid lymph procured from one of the vaccine establishments in London, a small stock being usually kept on hand. The results obtained in a total of 351 cases are as follows:

Presenting evidences of previous variola, 55—successful, 40; unsuccessful, 15.

Presenting good cicatrices, 266—successful, 141; unsuccessful, 125.

No evidences of previous vaccination, 30—successful, 11; unsuccessful, 19.

Percentage of successful results, 56.9.

It is not pretended that in all of these cases there was a result obtained comparable to that of primary vaccination, but in many, perfect umbilicated vesicles resulted; and in all, it is believed, there were vesicles with a fair areola, the presumable indication of infection.

Great care has been taken in the performance of vaccination, and the results have been noted at the time.

The lymph has been put in the arm, for the most part, by abrasion. In a majority the axillary glands were affected, often painfully. I ought, perhaps, to state that the majority of the crew was shipped on the station and in the Mediterranean, and that in many of these cases no vaccination had been performed since childhood, so that the resulting successful percentage is, perhaps, higher than might ordinarily be attained.

The suggestions that I should make with regard to revaccination in the Navy, would be that the medical officers of the different rendezvous should be charged with the duty of procuring fresh vaccine lymph, upon ivory points, from the vaccinating establishments of their various cities; that they should take only a sufficient quantity to vaccinate the persons who might be likely to present themselves during a limited period, say a

week or ten days; that the operation should be done at the rendezvous and a certificate given by the medical officer of the number and character of previous vaccine cicatrices on the body, evidences of previous variola, &c.; also of the number of insertions made by himself, which should not be less than three; the whole to be handed to the medical officer of the receiving-ship, whose duty it should be to watch the course of the vaccination and to note the result. This certificate, signed by the two medical officers of the rendezvous and receiving-ship, should finally be transferred to the surgeon of the ship to which the recruit is drafted for service, for his instruction.

A certain supply of lymph in capillary tubes should be furnished every vessel fitting out for sea, from the rendezvous, to be used for the vaccination of persons who might be shipped after leaving the United States.

These suggestions are made with great diffidence, and with no claim to originality; but if one ship might be, by a better system of vaccination, preserved from this loathsome disease, which demoralizes and depresses all on board, their purpose will have been answered.

The cost incident upon a single case of variola, the destruction of bedding, hospital expenses, &c., would more than furnish lymph to thoroughly revaccinate all the men shipped in the Navy in six months. I had proposed to give an account of variola as it presented itself, beginning on board this ship at Spezia in February last, but the length of the paper prevents. I would merely remark that in two cases the eruption was not noticed before the fourth day; and that in one, that of the commanding officer, who suffered from confluent small-pox, there was not at any time before the eruption the slightest pain in the back or head, but that he was greatly distressed for more than two days before the appearance of eruption by

incessant hiccough, a symptom that I have not found noticed in any text-book.

Three of four of the nurses who attended him, all of whom had had the small-pox, suffered severely from variolous fever, but without subsequent eruption.

VENTILATION IN SHIPS OF WAR.

By BENJAMIN F. GIBBS, M. D., U. S. N.,
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Some time since Rear-Admiral Collins issued a circular-letter requesting the officers of the South Pacific fleet to give their views upon the subject of properly ventilating ships. The result has thus far been interesting, and, if productive of no other result, will be the means of placing on record at the Department the matured ideas of those who spend the best part of their lives in ships, and hence should be in every way better qualified to form an opinion and judge of the necessities of the case than those who build the ships but do not go to sea in them. Not only so, but such persons whose home is the ship should be surely qualified to judge as to the requirements necessary to produce a definite result, which looks to the achievement of a more perfect and desirable system of ventilation in ships of war.

It may be stated as an acknowledged fact, that there has not yet been produced any perfect system of aspiration or induction of air by which it may be maintained in a condition of purity during the night, when all hands are below, when the hatches are battened down, or when the ship is filled with stores and making much bilge-water.

Parke's definition of ventilation for buildings may be applied to ships, although the means and plans necessary to effect a change of air in the latter are different from those to be used in the former, on account of difference of environment and shape and

character of the objects to be ventilated. He restricts the term "ventilation" to the removal, by a stream of pure air, of the pulmonary and cutaneous exhalations of men and of the products of combustion in ordinary dwellings, to which must be added, in hospitals, the addition of effluvia which proceed from the persons and discharges of the sick. All other causes of impurity of air ought to be excluded by cleanliness, and in ships by removal of all wood or fermentable matter from the bilge or hold, and by the proper use of disinfectants after the various lower parts are properly dried. Of course, in pursuing any system of ventilation we must disregard the destructive plans of removal of vitiated air which may be formed in the ship from fermentation, as this condition could not occur were the proper introduction and removal of air in constant and successful operation.

In contemplating this subject there are three conditions to be considered, viz: first, the quantity of air necessary to preserve a reasonable degree of purity in the ship; second, the proper means to be adopted for this purpose; third, the purity of the surrounding air.

Of course, this third condition need not ordinarily be considered in the study of ventilation for vessels of war in commission; so long as proper anchorages are secured, which are not immediately at the leeward of a locality from which there is an exhalation of malarial poison, and the surroundings are those of a healthful port or those of the open ocean. While a ship may be cruising in a latitude or locality of notedly pure atmosphere, or at anchor in a healthful port, we contend that, unless the temperature is low, or changes sudden, with a humid atmosphere, the environment for this ship is particularly good for the preservation of health. The approaches are unobstructed, and pure air comes from every direction.

Regarding the first question, as to the "quantity of air" necessary to preserve a condition of purity on board ship, those

results which have been obtained from experiments in houses, barracks, &c., regarding this matter are to be accepted and applied to the aggregation of human life on board a vessel in commission. The quantity of pure air for consumption is the same for one adult human being as another. The sailor, ordinarily attending to his duties on board ship, is peculiarly well conditioned for obtaining air and exercise while on deck. The only time when there is a compelled aggregation is during that period in which all the men are in their hammocks on the berth-deck. In case the deck of the U. S. S. Richmond should be crowded, each man can occupy but 56 cubic feet, (*cube d'emplacement.*) With such an exceedingly small space, in order to preserve any degree of purity, it is necessary to change the air at least twelve times per hour. Taking the average of the whole deck, however, including wardroom, steerages, &c., each man has about 150 cubic feet. In case this cubic space should be changed twelve times per hour, each man would have about 2,000 cubic feet per hour. But such currents of air as would be involved by this rapid change in cold weather would be dangerous in the extreme, and men prefer to endure confined air, by closing some of the ordinary apertures of inlet. It has been found that air moving at the rate of two or three miles per hour, even at ordinary temperatures, (60° to 70° Fahrenheit,) causes very unpleasant sensations of draught and cold; and, of course, a lower temperature is less easily tolerated.

These rapid changes of air on board ship cannot be effected by natural means. It is not expected to provide for a ship the extensive and liberal supplies of air that are possible and necessary on shore, for the reason that a ship is constructed in form, and by surroundings of land and water so conditioned, that it is entirely unlike hotels, barracks, or hospitals. In these the air-space demanded for well or sick is believed to vary from 800 to 6,000 cubic feet, with openings arranged so that a ventilation

can be carried on resulting in a change of air amounting to from 1,200 to 2,000 cubic feet per man per hour. But a ship has its compensations, in the usual purity of its surroundings, for its losses in form and the aggregation of men. Such air-space as mentioned above is impossible and unnecessary on board ship.

We have to consider that in a well-constructed ship, such as the Richmond, with reference to ordinary ventilation, there is about one-sixteenth of the whole surface of the upper or spar deck dedicated to openings, through which the fresh air enters and the vitiated escapes. During the night this apparently enormous supply is inadequate, if the temperature is high, and unattended by any artificial means. Were the ship placed inland, for illustration, with the same aggregation of men, and in the midst of populous surroundings, whereby the air would have become vitiated before reaching the ship, other and more extended provision would be necessary in order to compensate for an altered environment for the ship thus assailed by vitiated and obstructed approaches.

But it is not in air-supply for men that such vessels as this fail to reach that point of sanitary perfection which it is believed possible of achievement. In addition to the organic exhalations from the bodies and the respiration of such compact aggregates of men, for whom a pure atmosphere must be provided, we have to contend against the exhalations from the stores placed on board, the decaying wood and timbers, oil, bilge-water, &c., all of which collect in the lower part of the ship, and are with difficulty removed. The ordinary means of supplying fresh air, by perflation of wind-sails, only remedy the evil in a measure, by diluting the foul air. We must, in addition, exert an extracting force if we would remove it; and this is the great object to be achieved, and for which, as yet, no practicable inexpensive mechanism has been successfully applied.

We may therefore leave this question, regarding the least

quantity of air required for life and health on board ship, as an indefinite or undecided subject. No means have hitherto been used to supply it in generous quantities to the inaccessible places, by the removal of the vitiated air, while that now afforded by rapid changes of air on the berth-deck, under favorable circumstances, answers the purpose in an unsatisfactory manner.

The second question, regarding the proper method by which a due quantity of air may be regularly supplied on board ship, as well as that other problem, the best means of removing the vitiated air from the hold of a ship, is that in which we are most earnestly interested.

However simple the perfect ventilation of a ship may seem, it is actually beset with complexities which do not at first thought appear. The first difficulty is the general shape of a ship; the second is the compartments; a third, the proper diffusion of air, in being changed so rapidly, in a vessel of war without endangering health in producing draughts. For effective change of air, artificial ventilation must be resorted to, as during hot weather the natural change arising from differences of temperature is scarcely ever sufficient.

The shape of a ship may be said, without material error, for purposes of study of ventilation, to be that of a horizontal cylinder, in which the cylinder is furnished with two parallel horizontal compartments, to which are added other partitions intersecting these throughout the ship, in a most varied and irregular manner, and placed perpendicularly. Through the whole length of the upper and lower horizontal compartments are made, one above the other, large square ventilating holes or hatches, equal in extent to one-twentieth or one-sixteenth of the upper horizontal compartment or spar-deck of the ship. A body of this shape and position is ventilated with difficulty; this is not so much owing to want of openings for ingress of air, as to the difficulty which attends its extraction by any system

of natural ventilation. As every one knows, all natural ventilation must be secured by either the aspirating power of the wind or its perflating propulsion; or that made use of in a well-proportioned mansion, in which it depends upon the difference between internal and external temperatures.

During the hot weather we can scarcely expect to make use of combustion for artificial heat, without mechanical intervention, for purposes of ventilation. The natural ventilation of a ship, which depends on the difference of temperature between the external air and that in the bottom of this horizontal cylinder-shaped body before referred to, is exceedingly small in hot weather. Without the use of wind-sails, this lowest horizontal stratum of air in the cylinder, consisting of heavy, foul gases and organic matter, would not be materially disturbed by the natural ventilation depending on velocity of movement arising from the height of column and difference of temperature between the upper and lower ends.

For illustration, I take the case of this ship, the Richmond, which is generously provided with hatches and perpendicular ventilation, to show the change of air on account of above difference. The temperatures taken were as follows, under the most favorable circumstances, in the harbor of Talcahuano, Chili: Thermometer on spar-deck, 61½° Fahrenheit; at the same time in the lower hold, 64½° Fahrenheit; difference, 3° Fahrenheit. According to the table of Montgolfier, with the difference in height of the positions of the two thermometers, of, say, 15 feet, we get the natural movement of air, on account of the 3° difference, as 108 cubic linear feet per minute, or 6,480 feet per hour.

Supposing that a fair amount of fresh air per man per hour be considered as 2,000 cubic feet—the Richmond, we will say, carries 350 men and officers; this will require 700,000 cubic feet of fresh air per hour to be diffused through the berth-deck space of 40,000 cubic feet, or a total change of eighteen times per hour;

700,000÷6,480 = 108 (round numbers) square feet only are required for entrance of air in the quantity arising from the force of difference of temperature. Taking all the open hatches and air-ports, we have about 450 square feet of opening, which is reduced to, say, 220 by requirement of space for current of exit, or about twice as much as is necessary to provide each man with 2,000 cubic feet per hour at the temperature of 61½° Fahrenheit.

This is probably the most favorable exhibit that can be made for a ship, and it seems strange, with such a great amount of air-openings, there should ever be insufficient ventilation. A temperature of 80° or 90° Fahrenheit would require 3,000 or 4,000 cubic feet per hour per man, and increase of temperature facilitates ease of dispersion. At such temperatures there is but slight difference between that of external air and that in the lower part of the ship. In fact, the latter is usually then lower, and opposes natural ventilation. In the next instance, no account is taken of impurities in that part of the vessel most difficult to ventilate, viz, the lower hold, coal-bunkers, store-rooms, and bilge. Lastly, it must be remembered that, from the 450 square feet mentioned as the area of openings for admission of air, more than one-half must be deducted as an area required for an opening of exit for rising air in motion. The openings of exit must be increased also to admit of an expansion of air equal to .002 of a cubic foot for each increasing degree of temperature. We might say, hence, of this ship, that we have, with all our openings, 225 square feet for entrance, and, at the temperature of 60° Fahrenheit, enough to admit 4,000 cubic feet per hour for each of the 350 men, natural ventilation.

But this does not occur for respiratory purposes. This difference of temperature, even with men below, in their hammocks,

would not be found between the spar and berth decks of the ship; and, while the statement shows the capability of the ship for this generous supply, there would be error in supposing that the men receive it. The great barrier opposing the realization of the above results is the difficulty found in diffusion and dispersion, and of moving the volume of statical air, which is that vitiated from respiration and animal exhalation.

At a continued temperature of from 80° to 90° Fahrenheit, to which we are exposed for the greater period of the cruising, there can be no difference of temperature favoring natural ventilation. If there should be, the rarefaction of the air is so decided, that it does not circulate rapidly, and carries with it no invigorating effect. Air on these occasions is perflated by wind-sails, at the rate of from six to ten miles per hour, in the lower parts of the horizontal cylinder before described. There is very little discomfort in sitting near such a current, which in open air at a lower temperature would be unendurable, and even dangerous.

The very great disproportion of this horizontal body in its length to its depth causes all laws usually accepted in ventilation, based on differences of temperature, to be impracticable. We have a great blast of wind driven into the hold of the ship, which does not reach ten feet from the lower end of the wind-sail, but the air follows its law of circulation without regard to the shape of the body or vessel we are attempting to ventilate, if this be unsuited to conform to natural air-currents, and immediately ascends through the hatch down which it entered.

In our endeavor to cause a current of air to pass through the length of this vessel (Richmond) we too often fail. In some instances the perpendicular bulk-heads absolutely cut off all means or passages for moving air-currents even where artificial means are resorted to for its accomplishment. Of such are the Ossipee and Tuscarora class. Having been two cruises (four years) in

the former ship, I can most truly state that with her men below on her berth-deck it is most unendurable and oppressive. It was so cramped, that the men usually chose even exposure on deck to sleeping in their hammocks in warm weather. We have, then, to apply ourselves to achieve our grand object of inducting currents of air to pass through the length of this elongated body and between each one of the horizontal divisions or decks.

How can this be done? Certainly not by natural means, or by propulsion or perflation, without a distant aspirating point or outlet. We must expect air to rise and leave by the same opening through which it entered, if there are no other openings which oblige it to assume a horizontal movement. What we seek, then, is a horizontal movement of the air by both propulsion and extraction. The means for extraction may be either artificial or natural, or rather the former should supplement the latter.

If we would have a horizontal movement, we must have unobstructed passage-ways on every deck for the passage of air.

The two natural conditions of the ship regarding ventilation must be considered separately, viz, the ship at sea and the ship at anchor in port.

THE SHIP AT SEA.

It may be inferred from what has been said that it is believed the removal of air by artificial process from the hold of the ship is more important than its induction. There is so little doubt of this, that a ship may be said to be well ventilated in which this is done. However rapid the removal of air may be made in any vessel of war with sufficient hatch-openings, there will be but little discomfort experienced below on account of strong air-current. This will naturally be the case, as it would be impossible to cut into the ship another set of openings equal in

area to the ordinary hatches for the purpose of aspiration or extraction. The natural dispersion of the vast column of air descending perpendicularly through the hatches and moving along the longitudinal center of the ship would naturally be very slow in the transverse directions toward its lateral walls if proper outlets were not provided there for its exit.

Presuming upon this, I am sure there can be no better plan provided, whether we intend natural or artificial ventilation, than to arrange in the wings of the ship, fore and aft, beneath the berth-deck, sheet-iron passage-ways large enough to admit a man, and perforated throughout their entire length. These passage-ways should be made on three sides, of iron, and finished by the ship's side on the fourth, in such a way as to allow of a proper ventilation of the timbers of the ship. These passage-ways should also have numerous openings on the berth-deck, connecting with it by perpendicular registers. These registers should rise several feet above the berth-deck, and be provided with light talc or metallic valves, so as to prevent an upward current of air from the hold. At the converging stern of the ship these passage-ways should approach each other.

The ship being at sea and under either steam or sail, with a four-bladed screw, and uncoupling well aft, we have a shaft continually revolving as our source of power. By attaching two eccentrics to this main shaft we can easily turn a wheel 7 or 8 feet in diameter, which could be geared to run two fans or blowers: One to receive and extract the air from each passage-way, and throw it out through a ventilating-pipe running upwards and projecting several feet above the upper deck, and provided with an aspirating cowl. Supposing that the shaft under sail shall turn twelve times a minute, and the large driving-wheel, standing as it should with its diameter parallel with the main shaft, make the same number of revolutions, the spindle of the blower will revolve not less than one

hundred and seventy times a minute. Supposing, also, that the blower-wheel be 4 feet in diameter, this will give a velocity of air for each fan at the circumference of the vanes, after deducting one-fourth for loss, of 1,585 feet per minute.

If the discharge-pipe be 2 feet in diameter, this would be in round numbers 3,000 feet per minute. At this rate, supposing the Richmond to contain 120,000 cubic feet of air, by these two blowers, in thirty-three minutes, the air of the entire ship would be changed without regard to the state of the hatches, and even if those on the spar-deck be closed. This removal of air, be it remembered, is first from the lowest part of the ship and the most inaccessible places. To save this power which is now lost, when the ship is under sail, for purposes of ventilation in this way would seem to be wise. We have the automatic air and bilge pump on board the Richmond, but cannot believe they are useful, unless the ship is rolling continually and not less than twenty degrees. Sometimes, when running with the wind free, or on the quarter, the ship is so steady that the automatic pump will not work, while the blowers, worked by the revolving-shaft, will operate successfully when the ship is going two and a half or three knots an hour.

Another mode of extracting foul air from the ship and of inducing currents, and which works well under all circumstances, at sea or in port, is by using iron lower masts. These, connected with the proposed passage-ways in the wings of the ship and painted black, would create an astonishing current upward. I observed this on a visit to Her British Majesty's ship Zealous, when she was flag-ship of the Pacific squadron. There were, in addition, to increase the air-current upward in the masts, and placed in the bottom of the masts, small charcoal-stoves, which were reached by an opening at the bottom of the masts. Without the use of these, however, in the Zealous, a linen pocket-handkerchief would be wafted upward. In the British sloop

Sirius, in the West Indies, the lower masts were connected with the passage-ways referred to, and the officers did not hesitate to eulogize the ventilation as most perfect in every respect.

Ventilation, unaided, at sea, on the berth-deck, is usually more imperfect than in port, on account of the necessary closure of the air-ports. Any means may be considered perfect enough which will cause the air to circulate equally well in the after orlop-deck and after end of the wardroom, in the sick-bay and fore-peak, as well as along the wings of the ship in the horizontal dimensions, reaching into each store-room and state-room, and removing the air from the whole of the lower part of the ship twice an hour, or even more.

Wind-sails will always be used. Permanent openings should be made through the deck beneath the forecastle, fitted with screw-plates and cowls to receive the air through the bridle-port when the weather will permit. By this perflation forward and aspiration aft, there would be induced a horizontal movement of air. This plan is valuable at sea, but more so in port. The fore and aft sails, when drawing well, are also powerful ventilators for the points affected by them. The air is also kept in motion on the berth-deck by the roll of the ship, but this effects no change of air in the lowest part of the ship. But, with the best of these ordinary expedients, the air on the berth-deck, when the men are below, is changed with difficulty.

THE SHIP IN PORT.

The ship at anchor is more difficult to ventilate thoroughly, unless it be provided with iron lower masts, or steam-power be devoted to that purpose. The air-ports are usually too small. Instead of being 7½ inches in diameter, they should be 10 or 12 inches. They should in fact be broad shutter-ports for the berth-deck, set in a metallic frame, and closing water-tight on rubber. Set in these should be the ordinary screw air-port.

CANVAS ASPIRA

DEVISED BY

SURGEON B. F. GI

U. S. Navy.

Fig. 1.
Long: Section.

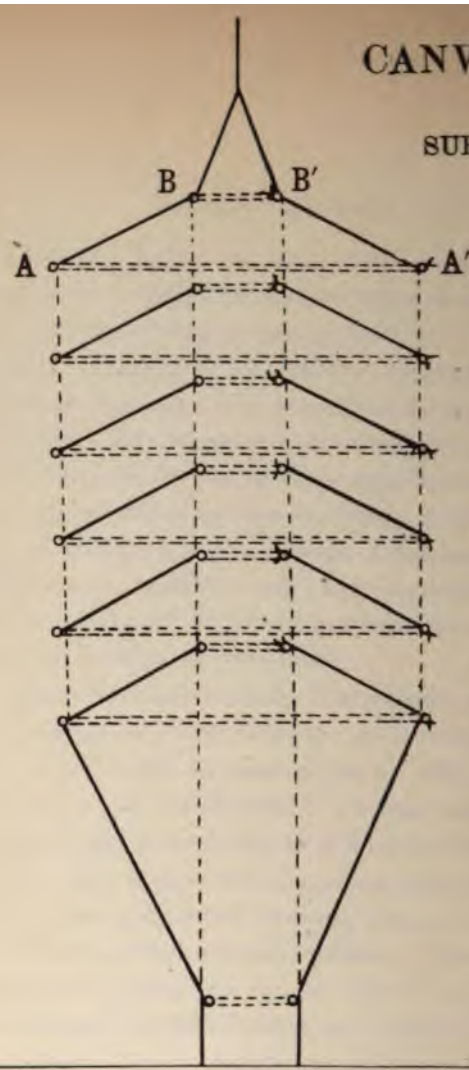


Fig. 2.
Transverse Section

There can be no doubt that it would be a wise sanitary measure to use steam-power, at stated periods, to remove, in port, the air from the whole lower part of the ship, by having a small engine to drive the aforementioned blowers.

The iron lower masts, in port, are most necessary, and will extract an amount of air to be secured by no other natural means. The horizontal current is formed and air is taken through the lateral passages. They are only second in efficiency to actual force exerted, and may even be made to act as aspirators by the louvre arrangement. Their efficiency depends, however, to a great extent, on the heat of the sun.

I have devised an aspirator, for use in port, to be made of canvas. Its use will be evident from the accompanying diagram, (see Fig. 1,) representing a longitudinal section, as well as its construction, by means of cones formed by alternating large and small hoops. A A are wooden hoops, 4 feet in diameter, forming truncated cones with B B, which are smaller wooden hoops, by means of canvas drawn over them. The canvas is tied on inside of small hoop and on the outside of the large one. These series of cones are attached, one below the other, by rope, represented by the upright dotted lines, which makes it more secure. In addition, these cones are made to preserve their shape and have their aspirating power formed by means of pieces of canvas sewn between the cones and placed perpendicularly, so that there will be six perpendicular divisions of 60 degrees each. In this arrangement the wind can blow from no direction without concentrating its force on the upper edge of each cone.

This will be represented in a transverse section of the cone of the aspirator, (see Fig. 2.) The figures 1, 2, 3, 4, 5, &c., show the strings which tie the outer hoop in, and the ends of the strings may be seen within the inner hoop. The ends of the perpendicular septæ at the small hoop A, B, C, &c., and at the

outer large hoop D, E, F, &c., are finished with ropes running from top to bottom of the aspirator to give additional strength.

Air, passing over or between these cones, will produce an upward current, and thus become an aspirator of the greatest service in port. Aspirators of great service may be formed of cowls kept constantly open from the direction in which the wind blows, by using vanes in such a manner that they will be so directed.

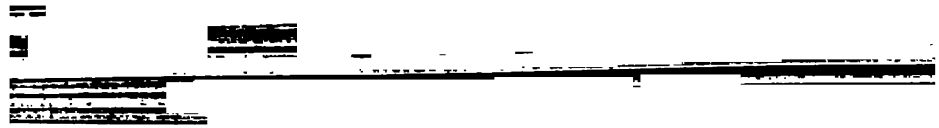
There is one other plan to be used in port, in connection with the lateral passage-ways previously suggested, in case the ship is not provided with iron lower masts or steam-power for purposes of ventilation, which is in every way superior, and may be thus described: If we allow a large perflation of air into the forward part of the ship, as she swings to the wind at her anchors, by means of a large open cowl directed toward the wind, and with the pipe passing directly downward through the deck, beneath the forecastle, so as to take the wind through the bridle-port, (by not taking it from the forecastle deck we get a purer air than would come over the head,) we will get a free current of air through the aforementioned lateral passages, and horizontally through the ship.

Nothing could be better, nor could any perpendicular perflation alone be as good, for this movement meets the whole indication, viz: We have a horizontal movement of air; we have a continuous fresh current of air passing, causing a large amount of aspiration, in consequence of this current passing perpendicularly to another current, by the former aspirated, flowing into the passages through the perforations from the open hatches.

These lateral air-passages, it should be remembered, are smooth and clear, and present an unangular and unobstructed tube for air from end to end of this horizontal cylindrical body, the ship, so difficult to properly fill with pure air and to relieve of the impure. The cowl at the stern of the ship, if properly

made and furnished with a vane, will act as a powerful aspirator, in addition to the perflating power from the forward part of the ship, resulting in a natural current.

Finally, all experience seems to concur in the opinion that no vessel of war can be even indifferently ventilated which does not have a clear berth-deck from end to end of the ship; for no horizontal movement of air can take place in the vessel which is beset by athwart-ship bulk-heads.



VENTILATION OF SHIPS OF WAR.

By JAS. S. KNIGHT,

SURGEON U. S. NAVY.

Having neither mechanical nor inventive genius, it is with much diffidence that I presume to offer any suggestions regarding the ventilation of ships; especially so when I think of the many scientific, practical, and useful means suggested by able writers who have published volumes upon the subject of ventilation and hygiene. What I shall have to say has perhaps been said many times before without seeming to cause any very lasting impression.

Regarding the constructions of ships I have no suggestions to make, but it does seem to me that the means we have at our command for the admission of pure air and the expulsion of foul air might be improved upon, or at all events might be more practically employed.

To remove the foul air which accumulates, and which finds so many hiding-places (if the expression may be allowed) in ships, it must be set in motion, and there must be a free circulation of air.

I presume that no one acquainted with the apparatus will question the usefulness of the automatic pump now in use, but it appears to me that it would answer the purpose much better if it were much larger, and better still if there were several instead of only one in each ship.

I have been informed that Surgeon H. W. Wells, U. S. N., has perfected a ventilator which it is claimed would add mate-

rially to our present means of ventilation. It is, as I am informed, a pipe passing through the deck into the air-port, on the top of which there is a movable hood. It seems to me also that the idea suggested by Dr. Gihon, in his book on "Naval Hygiene," would be a decided improvement over the present system of closed bulk-heads and store-rooms. They should be latticed at the top and bottom, for there would then be a freer circulation of air. Light is also a powerful stimulant, and is very conducive to health, and officers' quarters at least might be greatly improved by having thick plates of glass set in the deck where the guns would not come in contact with them. It may be urged as an objection that they would leak, but should that occur, might they not be reset?

Wind-sails are the least expensive, the most simple, and perhaps the most useful and important ventilating apparatus we possess that is now in use, with the exception perhaps of the automatic pump, or a fan to which steam may be attached; and it is to be regretted that they are not used more freely. They should be kept trimmed to the wind, and the lower end should be made fast within a few inches of the deck that is being ventilated. It is a conceded fact that dryness, cleanliness, and good ventilation are the most powerful disinfecting means and promoters of health, and with them we can do much toward keeping the berth-deck and holds of the ship dry and the air purified; and, by doing that we not only do much toward the preservation of health, but the preservation of the timbers of the ship as well. But we must not stop when we have provided for the admission of fresh air, for it is equally important to get rid of the foul air which accumulates so rapidly on the berth-deck when the crew are asleep. I will venture to say that there is not a vessel in the Navy that can berth the crew and allow to each one sufficient air-space; and in that case the air is in a very short time unfit for respiration. Everybody

knows that in all overcrowded and defectively-ventilated apartments the air soon becomes heavily charged with carbonic-acid gas and other noxious elements, for every expiration increases its temperature and humidity, and its tendency to absorb organic matters is thereby greatly increased. It is estimated by those who have given attention to the subject that each man on board ship requires twenty cubic feet* of fresh air every minute, and its rapid deterioration being greatly increased by the noisome gases and vapors arising from the decay and decomposition of provisions, leakage, &c., the subject of ventilation becomes one of great importance and interest to every naval officer. Now, in my opinion, with the automatic pump and the free use of wind-sails, and the observance of other sanitary measures admissible by practical operation daily, a very good, if not a perfect, system of ventilation can be established; and I would suggest that the pump be made larger, and as many as four, or perhaps six, be placed in each ship, and that wind-sails be kept set fore and aft whenever the weather will permit.

* Hammond states that thirty to forty are desirable, and Professor Donkin places the minimum at three thousand cubic feet per hour.—H. C. N.

REPORT

ON THE

VENTILATION OF THE UNITED STATES STR. OMAHA.

By LIEUT. J. F. MEIGS and ASST. SURG. HOWARD SMITH, U. S. N.

The following report is made concerning the ventilation of the United States Steamer Omaha, now (November, 1874) one of the Pacific fleet:

Her berth-deck has a capacity of 35,913 cubic feet, exclusive of officers' state-rooms, store-rooms, fire-room and engine-room hatchways, and the space occupied by the mess-chests and the men's bags, and including the wardroom and steerage countries and the sick-bays. The total hatch-area available for air entering from above to the berth-deck is 197 square feet; the air-ports are 60 in number, with a diameter of 7.70 inches, giving a total area for air-ports of 19.4 square feet. The wardroom is of such a capacity that each officer has 420 cubic feet of air-space allowed him. Dr. Billings, United States Army, in a report upon barracks and hospitals, fixes 2,000 cubic feet as the proper allowance of air-space for each man, (see Gihon's Naval Hygiene, page 47.) The berth-deck of the Omaha, from the mainmast forward to the sick-bay bulk-head, has a capacity of 19,748 cubic feet; in this space 210 men sleep. Deducting 3 cubic feet for each man, and 2 cubic feet for his hammock, this figure of 19,748 cubic feet will give to each man, when 210 men are sleeping below, 89 cubic feet of air-space. When but one watch is below, allowing 50 men for the watch on deck, the 160 men sleeping below have each 118 cubic feet allowed him.

With regard to the passing away of the carbonic dioxide expired by these men, the following calculation may be interesting: According to the best authorities, one man expires about 400 cubic feet of air from his lungs in one hour, 4 per cent. (16 cubic feet) of which is carbonic dioxide, (see Gihon's Naval Hygiene, page 43.) When 210 men are sleeping below, we thus see that they expire 3,360 cubic feet of carbonic dioxide. This amount, if no outlet were provided, as is approximately the case when all the hatches are battened down, would, in one hour, cause the air on the berth-deck to contain 17 per cent. of its volume of carbonic dioxide, enough to destroy animal life in a short time. The experiments recorded below go to show, by the mean of nine complete sets of observations made with an anemometer, that about 318,000 cubic feet enter and leave the berth-deck of the Omaha in each hour when the ship is in port; and it is reasonable to believe that a larger amount than this enters and leaves the deck when the ship is at sea. If 318,000 cubic feet of air leave the deck in each hour, this air must contain 1.05 per cent. of carbonic dioxide in order that the 3,360 cubic feet expired may be removed.

The ventilation-experiments were made with an anemometer purchased in Lima, and made by Nigretti & Qambra. It consists simply of a fly-wheel 3 inches in diameter, and with eight blades, and a gearing for registering the revolutions of this wheel on a dial-plate. In all the observations made, this fly-wheel was held for one minute in the air-current, whose velocity was to be measured and the record read from the dial-plate, the latter reading up to 1,000 feet. In calculating the air-space of hatches, a deduction of one-third was made from the total area of the hatch in all cases where two ladders and a cross-bar were in the hatch, and a deduction of one-sixth was made where the hatch was covered by iron gratings. The area so calculated was multiplied by the velocity of the air-current

to find the amount of air entering. The following calculation was made regarding the respective values of iron and wooden gratings in respect to the air-spaces they afford: The Omaha's main hatch, (74 by 58 inches,) when covered with wooden gratings, has but 23 per cent. of its total area left open for the passage of air. Supposing it covered with iron-gratings of the same size and form as those covering the fire and engine room hatches of this ship, 84 per cent. of its total area would be left open.

The process used for determining the amount of carbonic dioxide (CO_2) present in the air in any locality depends upon the difference in the amount of oxide of calcium (CaO) present in lime-water before and after passing through it a measured quantity of air. The difference in the amount of oxide of calcium (CaO) present indicates that this amount of it has been precipitated as calcium carbonate ($CaCo_3$) by the carbonic dioxide (CO_2) of the air passed through it.

The following is a description of the test used to determine the amount of lime present in any specimen of lime-water:

Oxalic acid is added from a burette to the lime-water until the latter is neutral to test-paper, and the filtrate gives no further precipitate upon the addition of more oxalic acid.

$$CaO : C_2\ H_2\ O_4\ 2\ H_2\ O = 1 : X$$
$$56 : 126 = 1 : 2.25.$$

Or, every 2.25 grains of oxalic acid so expended represents one grain of lime (CaO) precipitated as calcium oxalate, (CaO ($C_2\ O_4$).) To describe an actual experiment: 16 fluid ounces (one pint) of lime-water was found to contain 6.6 grains of lime; 16 fluid ounces of lime-water were then placed in the lime-water bottle, the tin can filled with water, and the connections made and cemented. Three gallons (384 fluid ounces) of air were then passed. This lime-water was then found to contain but 5.6

grains of (CaO) lime, showing that one grain of lime (CaO) had been precipitated as calcium carbonate ($CaCO_3$) by the carbonic dioxide (CO_2) of the air passed through.

$$CaO : Co_2 = 1 : X$$
$$56 : 44 = 1 : .785.$$

Or, 1 grain of oxide of lime unites with .785 grains of carbonic dioxide. We have found that .785 grains of carbonic dioxide was present in the 384 fluid ounces of air passed through. One grain of carbonic dioxide has a volume of 1.1122 fluid ounces.

$$.785 \times 1.1122 = .87307.$$

So .785 grains of carbonic dioxide has a volume of .87307 of a fluid ounce, which is the volume of carbonic dioxide found in the .384 of a fluid ounce of air. This is a percentage of .227 of one per cent.

The following is the record of the observations taken with the anemometer. Nine complete sets were taken; each set comprising an observation for the velocity and direction of the air-current in all the berth-deck hatches. The mean of the nine sets, calculated by multiplying the velocity of the air-current found by the area of the hatch, corrected as is stated above, gives 317,924 cubic feet of air as passing out, and 164,954 cubic feet as entering per hour. The deficiency in air entering, as shown here, was ascribed to the air entering by the air-ports; no satisfactory observations could be made in these, as the air-currents in them were intermittent. The observations were all made at different times during the night and while the ship was in port. The circle made by the ventilating-currents was always found to be the same.

The observations were made when the wind was in a variety of directions relative to the ship's head; and though the velocity and direction of the wind has a great influence on the ventilation of the ship, yet the ascending and descending cur-

rents were always as represented in the sketch. The men all sleep forward of the mainmast.

The following is a record of the observations made to determine the amount of carbonic dioxide present in the air:

No. 1.—November 10, 1874, 2 p. m., in port, in the wardroom store-room, percentage of CO_2 found, .136 of one per cent.

No. 2.—November 11, 1874, 3 a. m., in port, berth-deck, forward, just abaft of sick-bay bulk-head, percentage of CO_2 found, .341 of one per cent. Thermometers on deck at the time of experiment, dry bulb, 57°; wet bulb, 54°; thermometers at the point where the experiment was made, 64.5° and 59.5°. Amount of air entering the berth-deck, as shown by observations made with the anemometer, 314,298 cubic feet per hour; amount of air being discharged, 488,694 cubic feet per hour.

No. 3.—November 13, 3 a. m., in port, same place as the preceding observation, percentage of CO_2, .181 of one per cent. Dry and wet bulb thermometers on deck, 57° and 53.5°; at point of observation, 64.5° and 59°. Amount of air found to be entering the berth-deck, 108,212 cubic feet per hour; amount discharging, 172,980 cubic feet per hour.

No. 4.—November 20, 2.30 a. m., at sea, same place as in the two preceding observations, percentage of CO_2 found, .181 of one per cent. Dry and wet bulb thermometers on deck, 62° and 60°; at point of observation, 65° and 63°. No observations were made with the anemometer.

No. 5.—November 12, 1 a. m., in port, berth-deck, ten feet forward of the main hatch, percentage of CO_2 found, .159 of one per cent. Dry and wet bulb thermometers on deck, 61.5° and 58.5°; at point of observation, 64.5° and 61.5°. Amount of air entering the berth-deck, 8,208 cubic feet per hour; amount discharging, 117,408 cubic feet per hour.

No. 6.—November 21, 12.30 a. m., at sea, same place as the preceding observation, percentage of CO_2 found, .113 of one

per cent. Dry and wet bulb thermometers on deck, 62° and 61°; at the point of observation, 64° and 62°. No observations were made with the anemometer.

No. 7.—November 12, 2 p. m., in port, in fore-passage, percentage of CO_2 found, .181 of one per cent. At the time when this observation was made the forward up-cast was drawing from the fore-passage 11,826 cubic feet of air per hour. But it is thought that a large amount of this air comes from a small opening (18 inches square) into the sick-bay just abaft the opening of the up-cast; a well-marked current was found to be descending this opening, but no current could be detected in the large hatch to the berth-deck in the after part of the fore-passage. The automatic pump was found to be discharging air.

No. 8.—November 12, 3 p. m., in port, in fore hold, on the water-tanks, percentage of CO_2 found, .227 of one per cent.

No. 9.—November 14, 3 p. m., in port, air drawn by a rubber tube from the bilge at step of the mainmast, percentage of CO_2 found, .25 of one per cent.

No. 10.—November 17, 1.30 a. m., in port, under the top-gallant forecastle, percentage of CO_2 found, .272 of one per cent. Dry and wet bulb thermometers on deck, 57° and 54°; at point of observation, 63° and 60°. Amount of air entering the berth-deck, 124,260 cubic feet; amount discharging, 218,202 cubic feet per hour. The amount of air entering and discharging from the berth-deck is inserted here because the fore and sick-bay hatches, where the ascending air-currents were always rapid and well-marked, are under the top-gallant forecastle.

No. 11.—November 18, 9.30 p. m., at sea, in wardroom-country, several candles and two lamps burning, and all skylights but one, and all air-ports closed, percentage of CO_2 found, .227 of one per cent.

It is stated that the normal amount of carbonic dioxide in atmospheric air is .04 of one per cent.; and that more than .06

of one per cent. is obnoxious to health. (See Gihon's Naval Hygiene, page 43.)

The following remarks concerning the Thiers automatic air and bilge-pump and the up-cast shafts with which the Omaha is fitted are submitted:

The lower orifices of the suction-pipes of the bilge-pump are so far from the ceiling of the ship as to render the pump useless unless about four inches of water is in the bilge. The air-pump discharges air when the ship's rolling can be only just perceived. When rolling 3° each side, which is generally the case when in most of the ports on this coast, this pump will discharge 2,096 cubic feet of air per hour. This is assuming that the water in the pipe connecting the two receivers follows closely the motion of the vessel, and deducting one-tenth for loss in the valves. One suction-pipe of the automatic pump opens in the upper part of the shaft-alley, and the other one two inches above the floor of the fore-passage. This pump has required very little care and attention since the ship went into commission.

There is one shaft forward, of a diameter of one foot, opening by two separate orifices into the sick-bay and fore-passage, and two aft, of a diameter of nine inches, one opening into the wardroom store-room and the other into the shaft-alley. No complaint has ever been made of water entering the ship by these orifices. A number of observations of the velocity of ascending air-currents in these up-casts have been made, and it has always been found to be nearly one-half of the velocity of the air across the cowl of the pipe. This is true of the forward ventilator and of the after one that enters the wardroom store-room; the one entering the shaft-alley shows a less velocity, the pipe being of course longer. With what is termed a light air, the up-cast in the wardroom store-room discharges twice the whole cubical capacity of the wardroom store-room

and pantry in one hour. A few observations have been made with the ordinary canvas wind-sail, and they indicate that the velocity of the descending air-current is nearly that of the wind in which the head of the wind-sail is exposed. In a light breeze a wind-sail of 18 inches diameter would introduce 20,000 cubic feet of air in one hour

ON THE MECHANICAL MEANS OF PRODUCING ARTIFICIAL VENTILATION.

By G. W. BAIRD,
PASSED ASSISTANT ENGINEER U. S. NAVY.

In our scientific manuals, but scanty reference has been made to the subject of ventilation, and much less has been said of the artificial mode of ventilation.

Nature provokes in us the spirit of inquiry, and surrounded, as we are, by those whose only object it is to produce engines for the destruction of human life, it is with pleasure that we pass to a subject which has for its object the preservation of human life.

When "hot-air furnaces" were first fitted in public buildings in Washington, I observed with no little interest their construction, operation, and effect. Complaints of nausea and headache were constantly made by the clerks occupying rooms so ventilated and warmed, but no attention was paid them.

The ventilation was effected by passing a current of air across hot plates of cast iron and forcing it through conduits and registers into the apartments, by rotary blowers.

These plates formed part of the furnaces and flues, the thickness of which separated the products of combustion from the current of fresh air. These iron plates were fastened together as smoothly as possible, but, from being subject to extreme changes of temperature, warped and opened their joints in many places, and as the pressure of the fresh air was not at all times sufficient to force back the gases in the flues, these gases

With regard to the passing away of the carbonic dioxide expired by these men, the following calculation may be interesting: According to the best authorities, one man expires about 400 cubic feet of air from his lungs in one hour, 4 per cent. (16 cubic feet) of which is carbonic dioxide, (see Gihon's Naval Hygiene, page 43.) When 210 men are sleeping below, we thus see that they expire 3,360 cubic feet of carbonic dioxide. This amount, if no outlet were provided, as is approximately the case when all the hatches are battened down, would, in one hour, cause the air on the berth-deck to contain 17 per cent. of its volume of carbonic dioxide, enough to destroy animal life in a short time. The experiments recorded below go to show, by the mean of nine complete sets of observations made with an anemometer, that about 318,000 cubic feet enter and leave the berth-deck of the Omaha in each hour when the ship is in port; and it is reasonable to believe that a larger amount than this enters and leaves the deck when the ship is at sea. If 318,000 cubic feet of air leave the deck in each hour, this air must contain 1.05 per cent. of carbonic dioxide in order that the 3,360 cubic feet expired may be removed.

The ventilation-experiments were made with an anemometer purchased in Lima, and made by Nigretti & Qambra. It consists simply of a fly-wheel 3 inches in diameter, and with eight blades, and a gearing for registering the revolutions of this wheel on a dial-plate. In all the observations made, this fly-wheel was held for one minute in the air-current, whose velocity was to be measured and the record read from the dial-plate, the latter reading up to 1,000 feet. In calculating the air-space of hatches, a deduction of one-third was made from the total area of the hatch in all cases where two ladders and a cross-bar were in the hatch, and a deduction of one-sixth was made where the hatch was covered by iron gratings. The area so calculated was multiplied by the velocity of the air-current

the air in the corners, and, in fact, all round the sides of the apartment, is being changed very slowly, and consequently becomes partially vitiated. The most striking example I have ever seen of these "banks" of foul air was on board the Pensacola, in the engine-room, in 1863. The engines were horizontal, and were in two pairs, one pair opposite the other, bringing all of the cylinders outboard. These steam-cylinders, with their valve-chests and dash-pots, nearly filled the space between the keelsons and the berth-deck, and leaving but a narrow space behind them. There were no proper coverings on these cylinders to prevent the radiation of heat, and, when running, the temperature behind the cylinders often reached 160°. As this machinery was complicated, all its parts had to be looked after very frequently, and it was a great annoyance to us that a common oil-lamp could not be kept burning five minutes in the narrow passages behind the cylinders, the air not being rich enough in oxygen to support the flame in that unventilated place.

A small (10-inch) ventilator, cylindrical in form and surmounted with the usual hood, was placed over each of these passage-ways, one behind each pair of steam-cylinders. When trimmed face to the wind, a nice breeze came down, but as it took a direct course toward the fire-room, a lamp placed just out of this fresh current soon became extinguished. But when this little ventilator was trimmed back to the wind, which caused the hot air to ascend and pass off, the lamp burned freely. Owing to the small volume of air introduced by this little ventilator, trimmed face to the wind, the temperature was not materially diminished in the lower engine-room. The reduction of temperature, however, was less when it was trimmed back to the wind; though in that position it caused the lamps to burn, by exhausting the foul air.. In this position it became a chimney, which was assisted by the action of the wind rushing past

the hood. From this it will be seen that some means must be employed to exhaust the foul air, as well as introduce the fresh air. It is also evident that the introduction of fresh air does not ventilate the corners of an apartment, and this will forever preclude the use of a forced blast. Another objection to the "forced blast," as at present used on board the iron-clads, is the draught, which elderly persons, or those of feeble constitution, cannot stand. Even a robust man will often take cold if a slight draught is directed upon his feet, while the same person might stand a strong draught upon his head without fear of taking cold.

Air, like all other gases, is subject to the laws of gravity. Its molecules have a definite force of attraction and repulsion; with the elevation of temperature the force of repulsion exceeds that of cohesion, and the body expands; by its inferior weight, it is lifted by the cooler and denser air, which then flows in and takes its place, thus establishing a circulation. Change of air is rendered essential on board ship by the exhalations and respirations of the ship's company and the evolution of gases from the furnaces, bilges, and lamps. The *object* of ventilation, then, is, first, to remove these poisonous gases, and, second, to introduce an adequate supply of pure air. It has been estimated by eminent engineers, that for each adult there should be about 2,000 cubic feet of air allowed per hour. The poisonous gases are generated so rapidly that the air, if confined, is soon vitiated; but the large amount of air proposed will dilute the poison to such an extent as to render it practically pure. We take about 20 cubic inches at each inspiration, and at 18 inspirations per minute, one person would only consume $(18\times20\times60)\div1728=12\frac{1}{2}$ cubic feet per hour. As these exhalations are uniformly heavier than air, they naturally fall to the floor, and for this reason I have proposed to remove them through numerous registers placed in the floor.

The cheapest and simplest way of removing these gases from a steamship is to connect the register of each state-room (and other apartments) by means of proper pipes with the air-jacket that surrounds the smoke-pipe. This jacket is a light iron cylinder, which completely surrounds the smoke-pipe, leaving an annular space between them, as shown in Plate 1. Its object is to protect the surrounding wood-work from the heat of the pipe, and it usually terminates a few feet above the deck; but I propose to extend it to the full height of the pipe, in order to increase the draught. This necessitates a standing pipe, and, as standing pipes are not fashionable in the Navy, I have shown a section of a small merchant twin-screw steamer, with the pipe jacketed, and the exhaust-tube extending into the state-rooms, hold, and berth-deck.

The smoke-pipe of this little steamer was to have been 5 feet 3 inches in diameter, and its jacket 5 feet 9 inches. The area of cross-section of the annular space will be $\pi R^2 - \pi r^2 = 4.32$ square feet, in which R = radius of the jacket and r = radius of the pipe.

Now, if we can determine the velocity of the gases ascending through this opening, we shall be able to tell the exact number of cubic feet of air the jacket will exhaust from the interior of the ship in a given time.

It has been stated that all gases expand upon being heated; so the gases within this jacket, on coming in contact with the heated smoke-pipe, become heated, expand, become lighter than the external atmosphere, and ascend in obedience to the laws of gravity.

The theoretical velocity of the ascending gases will be equivalent to the velocity of a body falling through a space equal to the difference of the heights of two columns of air, (of equal base,) the one being at the temperature inside the jacket, and the other at the temperature of the surrounding atmosphere.

A cubic foot of air expands 0.0020276 times its volume for each Fahrenheit degree it is raised. Now, by measuring the temperature inside and outside the jacket, and the height of the jacket, we shall have all the necessary data.

Let the height of the jacket in feet = H = 30.

The height of a column of air at T° of equal weight and equal base to H = H′.

The temperature inside jacket = T = 250°.

The temperature of the atmosphere = t = 70°.

The velocity of the escaping gases in feet per second = V.

The height of the column, to give the velocity of the escaping gases, will be

$$H' - H = H\,(T - t) \times 0.0020276$$

$$\therefore H' - H = 30 \times 180 \times 0.0020276 = 10.949 \quad . \quad . \quad (1)$$

The velocity, then, will be

$$V = \sqrt{2g\,(H' - H)} = \sqrt{64 \times 10.949} = 26.47 \quad . \quad . \quad (2)$$

The area of opening between the pipe and jacket (4.32) multiplied by the velocity in feet per hour will give the total volume of air changed per hour, and this quantity divided by the number of cubic feet allowed each person will give the number of persons who can be served.

$(4.32 \times 26.47 \times 60 \times 60) \div 2000 = 205$, the number of persons.

Though this calculation is purely theoretical, it cannot fail to carry conviction with it, for the little steamer from which the data are supplied was designed to carry not more than sixty persons, including the passengers. I may here mention that 2,000 cubic feet of air is much more than is supplied at present to any building or ship in the United States, unless it is done by a blast; and I think many will agree with me that it is a larger quantity of pure air than is now delivered to the occupants of any of the public buildings in Washington.

As no experiments have been made to determine the resistance by friction of these gases in such a pipe, it is impossible

in this paper to give absolutely correct figures; but, as the theoretic value is three and a half times as much as is necessary, it will be perfectly safe to depend upon the jacket for this purpose.

To further illustrate the principle, we will take the new gunboat Huron for our next example.

The total number of persons forming the complement of this vessel will be 135.

The smoke-pipe is telescopic, and when "run up" is designed to be 50 feet above the level of the berth-deck. Being telescopic, the jacket cannot be carried above the lowest section of the pipe, therefore it cannot be used for this purpose. But could it be stationary and of the same height as when "run up," retaining the jacket to its full length, we would obtain a change of 932,688 cubic feet per hour, or 6,950 cubic feet for each person.

Let the radius of the jacket in feet $= R = 3.6$.

The radius of the pipe in feet $= r = 3.25$.

The height of the jacket in feet $= H = 50$.

The height of a column of air at T° of equal base and equal weight to $H = H'$.

The temperature in the jacket $= T = 250°$.

The temperature of the atmosphere $= t = 70°$.

The velocity of the current, in feet, per second $= V$.

From equation (1) we have

$H' - H = 0.0020276\ (T - t)\ H = 0\ 0020276 \times 180 \times 50 = 18.2484$

From equation (2) we have

$V = \sqrt{2g\ (H' - H)} = \sqrt{64 \times 18.2484} = 34.17$ feet per second.

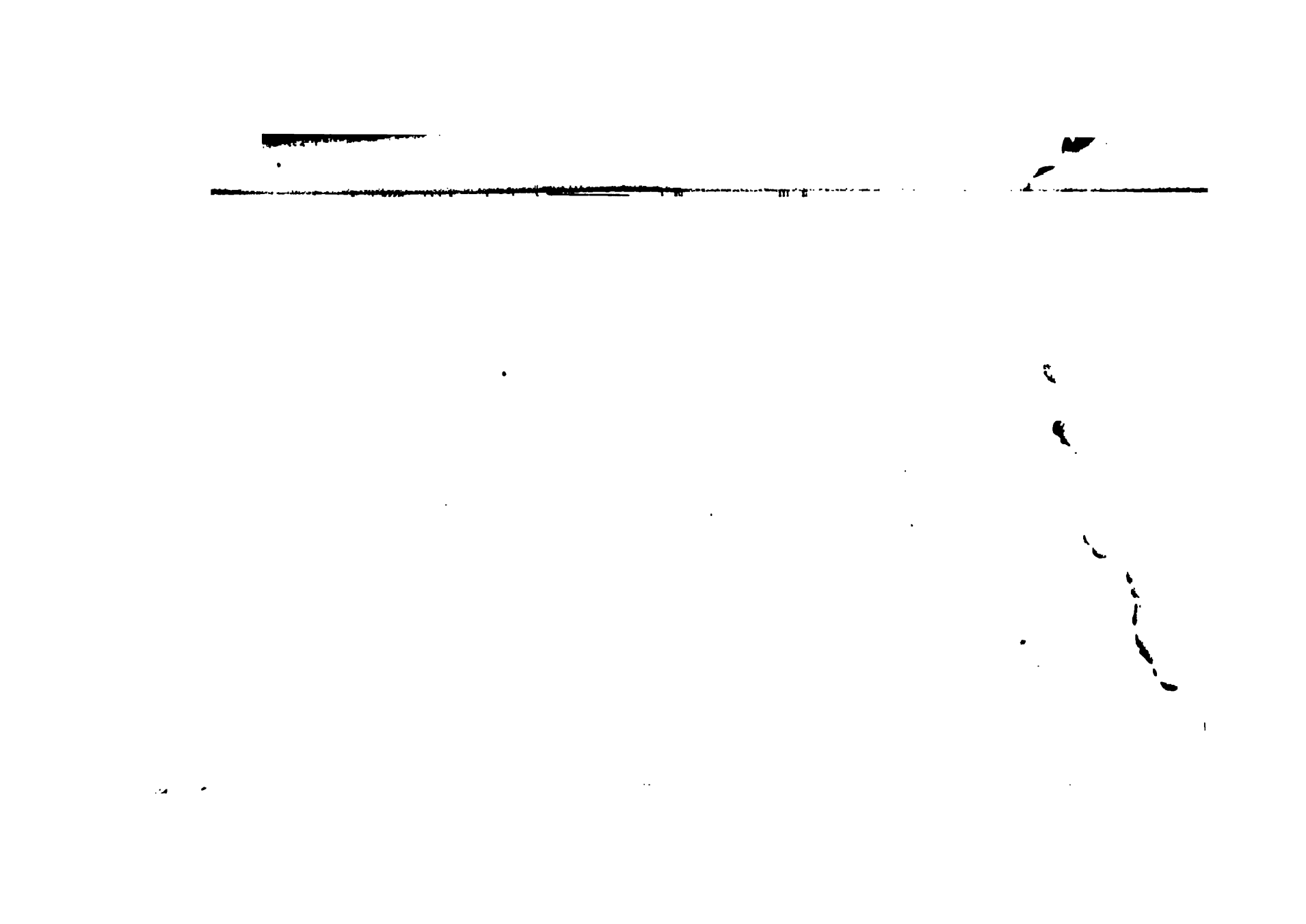
The velocity, in feet, per hour, $34.17 \times 60 \times 60 = 123{,}012$, and the area of opening, $\pi R^2 - \pi r^2 = 7.62$, being multiplied by the velocity and divided by 135, (the number of persons constituting the crew,) gives us 6,950 cubic feet for each person.

The advantages of this system of ventilation are manifest.

As the registers are numerous, there is no strong draught in any direction. The large hatches being open, the air enters at a very low velocity to supply the apartments, giving inconvenience to no one. As the foul air is removed, the apartments are kept clean and sweet, and as these currents of dry air reach every corner where there is a register, it will be invaluable as a means of drying the berth-decks, which now remain wet many hours after being washed. These "berth-decks," I regret to add, are perhaps the poorest ventilated places in the world. During the late rebellion, on board the Hartford, Pensacola, Richmond and other vessels of that class, three hundred men slept in a space of not more than 21,600 cubic feet, being 72 cubic feet for each man. There was nothing but the ordinary wind-sail in that day to force in air, but, instead of being equally distributed, that air took the most direct route to the nearest hatch and escaped. The stench arising from one of these berth-decks, when the crew is berthed, is nauseating. Professor Leeds estimated that more persons died in the United States in the year 1871 from the ill-effects of unventilated apartments (a year of profound peace) than the entire number of killed and wounded, on both sides, during our late war. It is a fact, patent to all who have sailed in them, that there are no places so poorly ventilated as our present ships of war. The preceding pages of this volume show the death-rate of our seamen, who, being carefully selected by eminent physicians, and subjected to a searching physical examination, are robust, healthy men when they enter the service.

VENTILATING BY AN EXHAUST FAN.

In vessels cruising in tropical climates and having a small boiler, the exhaust-fan can be used with great advantage. The only cost of ventilating a ship by this fan would be the bare cost of the oil for lubricating and the "wear and tear" of the



small machinery necessary to drive it. A very small quantity of coal will furnish the power, and the steam, after doing its work, may be exhausted into a small condenser, where it may be condensed and purified as drinking-water for the crew. All the improvements for aerating and filtering the water can be applied to this condenser quite as well as to the most improved distilling apparatus.

Improved fans are now made that will give a vacuum of 20 ounces, that being far more than is necessary for our purpose. They are durable and noiseless, and require a very small power to run them. The space they occupy is quite small, and as they may be suspended overhead, the space is not appreciable.

Allowing 2,000 cubic feet per hour, as before, to each person, and there being 135 persons, $135 \times 2{,}000 = 270{,}000$ cubic feet per hour, or $270{,}000 \div 60 = 4{,}500$ cubic feet per minute, will be necessary. An exhaust-fan, situated amidships, with a common inlet for four 6-inch pipes, one running forward, one each side of the deck, and one aft on each side, and perforated with proper registers, and driven by an engine, are all that is necessary. These registers should be largest farthest from the fan, and there should be one in each state-room.

Each of the four pipes will convey $4{,}500 \div 4 = 1{,}125$ cubic feet per minute to the common inlet of the exhaust-fan, whence it is forced into the smoke-pipe. Plate 2 shows a longitudinal section of the after part of the United States gunboat Huron, showing the position of the fan, engine, conduits, and the officers' quarters.

As the specific gravity of carbonic acid is so much greater than that of air, and as it sinks so rapidly to the floor, these registers should be as low down as possible, if not in the deck itself. By this means a current of fresh air is induced through the hatches, which, coming from overhead, is less liable to produce colds than if it came from any other direction.

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If, however, the draught is too strong, the registers may be partly closed.

A number of inventions have been patented, both in this country and in Europe, for the introduction of air into apartments, without draught, but few of these have been put into operation. Prominent among those that have been successfully used is the plan of Mr. H. Varley, which consists of a perforated zinc tube, opening into the external air, which passes round the cornice on three sides of the room; on the fourth side another perforated tube is connected with the chimney, and a draught is induced by the ascending gases.

It is true that the introduction of this air into the flue will reduce the draught, and so, also, would the admission of so large a volume of air into the air-jacket of the smoke-pipe slightly impede the draught.

"The energy of nature is a constant quantity," and the utmost man can do in the pursuit of physical truth, or in the application of physical knowledge, is to shift the constituents of the never-varying total, sacrificing one if he would produce another.

REPORT ON JABORANDI.

By F. V. GREENE, M. D.,

ACTING PASSED ASSISTANT SURGEON U. S. NAVY.

Although the new drug "jaborandi," introduced to the notice of the profession in Paris in 1873 by Dr. Continho, of Pernambuco, Brazil, has been extensively experimented with, both on the continent and in England, the conclusions arrived at by different observers in regard to several of the effects produced by it on the economy are so conflicting that it is highly probable that the leaves of distinct plants, or at least of different varieties of the same plant, have been used in the trials of this latest claimant for favor as a powerful sialogogue and sudorific. This opinion is in a measure confirmed by a statement contained in a paper read before the Lombardy Institute by Dr. Ambrosoli, and published in the Gazetta Med. Lombard., July 17, 1875, giving an account of a second series of experiments with jaborandi, in which the results were entirely different from those he had submitted in a former communication to the institute. In his first paper he had stated he had found the drug almost inert; but he had since ascertained that this was caused by his not having the genuine article, although obtained from the pharmacie centrale de Paris, as with a different supply he had become convinced that it was an agent of great potency in producing salivation and diaphoresis.

That further supplies of leaves and bark, purporting to be Pernambuco jaborandi, but in reality consisting of specimens derived from plants differing widely in botanical characters and

medicinal properties, will continue to be furnished from Brazil must be expected until it has been positively determined to what natural order the plant introduced by Continho belongs. The difficulty in the way of settling this point lies in the fact that the term "jaborandi" in the Guarany tongue is a generic one, and is applied to a number of plants of an acrid, pungent taste, possessing stimulant, sialogogue, and diaphoretic properties. The word itself undergoes slight modifications in the different provinces, changing into *jamborandi* and *iamborandi*, and finally, in Paraguay, becoming *yagarundi*. Consequently, with a common name, indicative merely of a similarity of medicinal properties, it is not surprising to find the term "jaborandi" applied to various plants in the natural orders of *Piperaceæ*, *Rutaceæ*, and *Scrofulaceæ*.

In the last century, Pison and Marcgraff, in their work "de Medicinæ Braziliensis," directed attention to three kinds of jaborandi, all most probably belonging to the *Piperaceæ*. Of these the most extensively known in Brazil is the *Serronia* (*Ottonia*) jaborandi of Gaudichaud. They are all used as stimulatories and as masticatories to increase the action of the salivary and lachrymal glands. In the "Travels in Brazil," by Spix and Martins, London, 1824, vol. 2, p. 92, among the medicinal plants described as generally known in the capitania of San Paulo, to the southward of Rio de Janeiro, mention is made of the *Piper reticulatum*, Lin., the root of which "is a powerful sialogogue, and often cures nervous toothache. The bruised leaves are applied with success to the bite of serpents." Geiger, in the Pharmacopœia Universalis, Heidelberg, 1835, pp. 250, 251, refers to both the *Piper reticulatum* and the *Piper nodosum*, Lin., of which latter he states that it is used in domestic practice as an irritant, and internally in chronic ulcerations. Chernovix, in his "Formulario," 8th edition, Paris, 1868, p. 403, also refers to the jaborandi of Brazil as the *Ottonia Anisum* of Sprengel,

belonging to the *Piperaceæ*, and states that the root is sialogogue, and is also used as a masticatory to relieve toothache. A tincture of the root (jaborandi, 1 part; alcohol, 8) is a stimulant, and is employed with friction in paralysis. Of the jaborandis belonging to the *Scrofulaceæ* we have the *Herpestis*, which were formerly referred to the genus *Gratiola*. The *Herpestis gratioloides* is sudorific and anti-rheumatic, while the *Herpestis monnuria* of Kunth, or the *Gratiola monnuria* of Lin., is said to be aperient and diuretic. Aublet, in his work on the plants of Guiana, gives a plate of the *Monnuria trifoliata*, which differs from the preceding jaborandis, and evidently belongs to the *Rutaceæ*. It possesses diuretic, sialogogue, and sudorific properties. This plant has been cultivated for some years in the Jarden des Plantes under the name of *Pilocarpus simplex* In 1847, Libon collected and sent to Europe still another Brazilian plant, which has been classified by Lemaire as belonging to the *Rutaceæ*, and to which he has given the name "*Pilocarpus pennatifolius.*"

In comparing the Pernambuco jaborandi with the Brazilian plants in the Jardin des Plantes, Baillon (Journal de Pharmacie et de Chimi, January, 1875) has concluded that it is decidedly rutaceous in character, and in consequence of its imparipinnate leaf and other points of resemblance very probably a species of *Pilocarpus*, nearly allied to the *P. pennatifolius* of Lemaire. The Pharmaceutical Journal and Transactions of January 23 and February 13, of the present year, contain articles by E. M. Holmes, curator of the museum of the Pharmaceutical Society, giving the results of his examination of a quantity of Pernambuco jaborandi, in which he was fortunate enough to find several ripe fruit. These he considers to be decidedly rutaceous, and he therefore confirms Professor Baillon's opinion as to the natural order to which the jaborandi belongs, and likewise believes it may be a species of *Pilocar-*

pus; but as there are several genera very nearly allied to *Pilocarpus* in the tribe *Xanthoxylaceæ*, to which he concludes jaborandi evidently belongs, it cannot be positively determined whether it belongs to the genus *Pilocarpus* or not until an examination of flowers shall have been made. These papers also contain much valuable information in regard to other parts of the plant, some portions of which will be referred to again. M. Planchon (Journal de Pharmacie et de Chim, April, 1873, p. 295) likewise found in a sample of jaborandi a few flowers, and a fruit which, although incomplete, was sufficiently perfect to give a clear idea of its structure. His examination of the different parts of the plant have also led him to the conclusion that it belongs to the genus *Pilocarpus*, of which it has all the characters, the disposition of the flowers and their structure being precisely the same as in plants of this genus. "As to the fruit, it agrees with that seen in the herbarium of the museum, belonging to the *Pilocarpi*, and particularly with that of the *Pilocarpus heterophyllus* of Asa Gray."

Shortly before leaving Rio de Janeiro, in April last, I received from a friend in Pernambuco a small package of jaborandi-leaves, obtained from a member of Dr. Continho's family. As the quantity was entirely too small for experimental purposes, a further supply was promised in a few months. This latter was received by me about the middle of last month, and on comparing the leaves with those of the original parcel, I became satisfied that they were obtained from the same plant. In addition to a number of almost perfect leaves, the package contained several stems, branched, as described by Holmes, at an angle of about 20°; these branches being furnished with alternate leaves, which are imparipinnate, with from two to five opposite leaflets (Planchon has met with leaves having as many as seven, nine, and, more rarely, eleven leaflets) articulated to the rachis by short petiolules, thickened at the base. The leaflets, which are cori-

aceous in texture, vary considerably in size and outline. As a rule, they may be said to be oblong-lanceolate, and are entire, emarginate, with an unequal base. The mid-rib rises very little above the upper surface of the leaflet, but is very prominent and sharp on the lower. The veins, which are rather more prominent on the lower surface, leave the mid-rib at an angle of about 60°, pursue a parallel course across the leaflet, and finally turn upward, and anastomose within about a quarter of an inch of the margin. The leaflet is pellucidly punctate, and these receptacles of secretion, numerously and irregularly distributed throughout the whole leaflet, are plainly visible when held up to the light.

Several specimens of the fruit, detached, however, from the peduncle, were also found among the leaves, and their characters confirm the description of Holmes, that "when perfect it consists of five carpels, of which not more than two or three are usually developed to maturity;" and that, "when ripe, the carpels dehisce into two valves, and then remind one strongly of miniature cockle-shells, with the valves open, exposing the animals." The black, shining, reniform seed, (one for each carpel,) with its lancet-shaped hilum, its sharp ridge on the back toward the apex, and the smooth, pale-yellow endocarp surrounding it, answers so accurately to that described both by Holmes and Planchon, that, taken in connection with the characters of the carpels, leaves, stems, and root, there is no room to doubt that the specimen of jaborandi sent me is identical with that taken to Europe by Dr. Continho. On one point only is there a difference between the jaborandi in my possession and that examined by Mr. Holmes, namely, that the under surface of some of the leaves in my specimen is covered with a thick velvety pubescence, which extends to the stem, while the Pernambuco jaborandi examined by him is described as glabrous in every part. As he has, however, met with hairy leaves, he

remarks that there appears to be two varieties, if not species, of this *Pilocarpus*. I am, however, inclined to the opinion that the pubescent condition prevails on the young leaves, which become glabrous as they proceed toward maturity; this being also the view taken by Planchon, who states that the gradual passage from the pubescent to the glabrous state can be traced in the same plant; a change which had already been noticed by Lemaire, and expressed in his description of the *Pilocarpus pennatifolius*, in the following words: "Frutex prima juventute puberolus, deinde glabrosis."

I have been unable to ascertain, either from the numerous articles in the journals or from the reports of the discussions on the subject at the meetings of the different societies, that Dr. Continho has ever communicated the precise locality from which he obtained the jaborandi, the only reference to the subject being a remark of Gubler's, that it had been obtained with considerable difficulty from the northern provinces of Brazil. This omission is supplied in the letter accompanying the specimen received by me in Rio de Janeiro, in which it is stated that the shrub is not found in the vicinity of Pernambuco, but grows in the province of Ceara, situated to northward of that port.

As the results of the experiments with jaborandi are scattered throughout numerous journals, before giving an account of the cases in which I have tried the new drug, it may not be amiss to present a brief *résumé* of the conclusions arrived at by different observers.

In April and May of last year the Revue Scientifique, the Gazette Hebdomadaire, and L'Union Médicale contained notices of experiments, showing that the leaves of the jaborandi possessed the properties of a powerful sialogogue and sudorific. Rabuteau prepared and took an infusion of about three grams of the leaves, and in from ten to fifteen minutes, finding his

forehead becoming moist, went to bed, when sweating came on, accompanied by profuse salivation, which continued for about two hours. Gubler also, after repeated trials of the drug at the Hôpital Beaujon, likewise reported that it acted as a powerful sudorific and sialogogue; and that in a few minutes after administration the perspiration began to stand out in large drops on the forehead and face, finally covering the whole body, while at the same time the saliva flowed so profusely as to render articulation almost impossible, the quantity collected in some cases amounting to considerably more than a pint. In continuing the experiments, in Gubler's words, Robin calls attention (Le Progrès Méd., 1874, No. 21) to the increase of the lachrymal secretion previous to the appearance of the perspiration and salivation; and further states that there is also augmentation of the secretion from the nasal, bronchial, and gastric mucous membranes. In experiments on dogs the mucous membrane of the stomach was found to be congested, and even ecchymosed in some places. With regard to the effect of the drug on the kidneys, his researches (Bulletin Gén. de Thérap., November 30, 1874) go to prove that the quantity of urine is somewhat diminished on the day the drug is administered, but that on the next day the amount is about normal, although a slight diminution has been noticed in some cases. The amount of urea appears to decrease on the day of administration, returning afterward to the normal standard, while the chlorides and uric acid are similarly affected. Uric acid was not detected either in the saliva or perspiration, but urea in considerable amount was found in both fluids. Vomiting is also stated to have occurred thirty-eight times in ninety cases. Diarrhœa, previous to the sweating, was also noticed in a number of cases, but it generally subsided as soon as the drug was eliminated from the system. In thirty-two experiments the pulse began to rise as soon as the sweating commenced, the number of beats

increasing until the action of the drug reached its maximum, after which it became gradually less frequent, so that after the sweating there was a notable lowering, which sometimes persisted for several days. Sphygmographic tracings showed complete asystolia during the sweating stage, from which fact Robin infers that jaborandi acts by paralysis of the vaso-motor nerves. A gradual elevation of the temperature of the body was also noticed, beginning at the moment the perspiration made its appearance, and continuing through the sweating stage, after which there was a reduction of from 1° to 2° C., which lasted for a day or so.

In the experiments in England, by Ringer, Gould, and Murrel, (Pratitioner, December, 1874; London Lancet, January 30, 1875, and British Medical Journal, April 24, 1875,) the observations of the French writers are confirmed, as far as regards the effects of jaborandi on the skin, salivary and lachrymal glands, and bronchial mucous membrane, as likewise the increased frequency of pulse occasioned by its administration; that it affects the alimentary canal sufficiently to produce diarrhœa is denied. The difference of opinion between Robin and Ringer, in relation to the effect produced on the temperature, is most remarkable, for while the former asserts that there is a rise of from 1° to 2°, the latter as positively states that, in twenty observations in eighteen adults, in every instance "the temperature fell during sweating," the fall ranging from 0.4° to 1.4°, average 0.9°, lasting from one and a quarter to four and a half hours, and then becoming normal. The flushing of the face, ears, and neck was absent, but, in one of the above cases, and with but two exceptions, was followed by pallor and more or less depression. He further states that, in about one-half the cases, the patients became decidedly sleepy when the pallor showed itself, which occurred one, two, or more hours after the administration of the drug. There was nausea in about two-

thirds of the cases. Ringer's attention was first called to the effect produced by jaborandi on the sight by Martindale, who, after taking a full dose, found, in the course of an hour, that everything at a distance appeared hazy, and that, although he could read moderate-sized type at the distance of one foot, at two it became indistinct. Similar disturbance of vision was noticed in several other cases, and in thirty instances, when an extract dissolved in glycerine was applied to the eye, contraction of the pupil occurred in nineteen, while its action was rendered sluggish in the remainder. In this connection, Sawyer relates an interesting case (British Medical Journal, February 6, 1875) as occurring in Queen's Hospital, Birmingham. The patient took six grams of jaborandi at 10.30 a. m., and at 11.40 a. m., perspiration and salivation still going on, could not distinguish objects across the ward, a distance of 25 feet, although he could see a person on the other side of his bed. There was no contraction of the pupil. At 12.10 the action of the medicine had almost entirely subsided, and the disturbance of vision had passed off.

Robin also made known the fact that the salivation produced by jaborandi was completely arrested by atropia, (Le Progrès Médical, 1874, No. 47,) which, he asserts, produces contraction of the arterioles, that had become dilated in consequence of the diminution of arterial tension brought about by the paralyzing effect of the drug on the vaso-motor nerves. Vulpian afterwards (*ibid.*, 1875, No. 6) remarked that it likewise considerably diminished its diaphoretic action. In the papers referred to above, Ringer, after pointing out the strong antagonism that exists between belladonna and jaborandi in their action on the secretions from the skin, salivary glands, and mucous membranes of the nose, bronchial tubes, stomach, and alimentary canal, as well as the different manner in which they affect the arterioles and pupil, gives the details of some cases in which they

were used to counteract each other. In five minutes after giving a hypodermic injection of one-hundredth of a grain of atropia to three men, who were under the influence of sixty grains of jaborandi, the perspiration and salivation were greatly diminished, and in twelve minutes entirely checked. To a lad who, five hours before admission to the University Hospital, had taken a grain of the alkaloid, and whose mouth and tongue were quite dry, thirty grains of jaborandi were given with the effect of producing less dryness of mouth in a quarter of an hour, and profuse sweating in an hour, when his mouth became naturally moist. Dr. Ringer has also ascertained that the antagonism between the two remedies holds good also in regard to the mammary gland, he having found the quantity of milk in two cases, where the secretion was scanty, to be considerably increased after administering jaborandi in doses of thirty grains.

Although jaborandi has already been used as a curative agent in a variety of diseases, very much more extended observations will be required before it can be ascertained what its merits as a therapeutic agent really are, and in what class of affections it is most likely to prove of benefit.

Gubler and Robin, who have used it in acute articular rheumatism, noticed, after the administration, a lowering of the temperature, with almost total disappearance of the pain. In acute bronchitis, with emphysematous condition of the lung, (Le Progrés Médical, 1874, No. 47,) there was improvement, with drying up of the mucous secretion. In Bright's disease, the œdema rapidly disappeared, but soon returned, which was also the case with the albumen, which was at first considerably diminished, but afterward increased, and in several instances exceeded the amount before the remedy was taken. As jaborandi excites the action of the heart, Gubler, Robin, Parrot, and Carville recommend that care should be taken not to employ the drug in cases complicated with valvular disease. The

Journal de Thérapeutique for January, 1875, contains an account of eight cases treated by Dr. Feriol, in the Maison municipale de Santé. In one of these, a case of chronic rheumatism, of probably syphilitic origin, the remedy was repeated fifteen different times, with relief from pain for some hours after each administration. The medicine was, however, discontinued, as it was not deemed advisable to continue so lowering a mode of treatment, and potassium iodide substituted, which, however, did not relieve to the same extent as the jaborandi. Relief from pain was also experienced in a case of acute rheumatism, but the medicine had to be discontinued in consequence of cardiac complication. Failure attended its use in a case of gout, an attack occurring a few days after its administration; and in a neuropathic patient, with hypochondriasis and tendency to paralysis, the hemicranial pain was very much intensified. In the other cases, the effects were negative. M. Crequy, in the Bulletin Général de Thérapeutique, March, 30, reports a case of pleurisy of the left side, where, notwithstanding the use of purgatives, blisters, and diuretics, the effusion increased to such an extent as to displace the heart to the right side. Under the use of jaborandi, in five-gram doses every two or three days, the effusion was gradually absorbed. In all, nine doses were taken. Czernicki has had the opportunity of investigating the effects of jaborandi in several cases of mumps occurring in the garrison at Luneville, and gives (Gazette Hebdom. April 2, 1875) an account of the remarkable success attending its use in one of these, which was complicated with metastatic orchitis. On the fourth day, the testicle being double the natural size and very painful, the skin hot, pulse rapid, and parotids reduced in size, a dose of jaborandi was given at 3 a. m. In fifteen minutes the patient was sweating profusely and the saliva flowing freely, affording relief. The next morning there was very little pain in the testicle. No other treatment was ordered,

and two days afterward the patient left the infirmary with no trace of the disease remaining. Dr. Franz Riegel, of Cologne, has also derived benefit from the employment of this remedy in effusions into the pleura, chronic pneumonia with nephritis, acute and chronic rheumatism, cirrhosis of the liver, and lead-colic. He has, moreover, noticed, among the after-effects, hiccough, and in two cases transient muscæ volitantes. The after-effects were always moderate, and did not persist for any length of time.

An interesting fact in relation to the new drug has lately been brought to light by the investigations of Ringer, whose experiments show that children are but slightly affected by it, frequently no effect being noticed after the administration of thirty, or even sixty, grains. Out of seventeen children to whom it was given, only two sweated freely; in seven no effect was produced, and in the remainder the skin merely became moist. Salivation was likewise generally absent, and when it did occur was merely enough to make the mouth moister than usual. Vomiting occurred in eight cases, mostly two hours after the medicine had been taken.

On the continent jaborandi has generally been administered in doses of four to six grams of the bruised leaves infused in hot water, the dregs being taken with the liquid. In England, Ringer and others have employed a tincture containing thirty grains to the fluid drachm, two of which are considered an ordinary dose. With the view of avoiding the vomiting frequently produced by the administration of the medicine by the mouth, Dujardin de Savignac made use of the infusion in the form of enemata, which he found effectual in producing salivation and sudation. In a case of uræmia he used hypodermic injections of the concentrated infusion without any irritant action resulting. In the Repertoire de Pharmacie, March, 1875, M. Byasson states that his examination of the jaborandi-

leaves shows that they contain a volatile oil, an acrid resin, and an alkaloid, which he separated as a viscid aromatic substance, soluble in chloroform, ether, absolute alcohol, ammonia, and dilute acids. As it is the active principle of the plant, Mr. Holmes has proposed to call it "'pilocarpina,' as the term 'jaborandina' has been already appropriated by Parodi for the alkaloid extracted by him from the Paraguayan 'yagarundi.'" A. W. Gerrard has also succeeded (Pharm. Jour. and Trans., May 1, 1875) in obtaining the chloride and nitrate of the alkaloid in crystals. The full therapeutic effects of the drug were obtained with half a grain of the latter salt; and one drop of its solution (gr. j to f℥j) placed in the eye produced decided contraction of the pupil.

In the following cases in which I have tried the effects of the jaborandi-leaves, the preparation used has been a fluid extract made with 50 per cent. alcohol, the dose of which, representing sixty grains, is one fluid-drachm. As my observations in every case in regard to the temperature of the body are entirely at variance with the results obtained by Ringer, I have thought it advisable to present one or two cases in detail, so that the changes in this respect during the action of medicine may be seen at a glance.

J. J——, æt 30, syphilitic rheumatism. Has occasional pains in joints and constant pain and soreness in both heels. Before administering jaborandi, on 30th September, patient's pulse was 75 and temperature in the axilla 99.2°. At 10.35 a. m. patient placed in bed and f℥j of the fluid extract administered. At 11.05 a. m. there was flushing of the face, ears, and neck, and in a few moments after drops of perspiration appeared on forehead, and mouth began to fill with saliva; pulse, 90; temperature, 99.4°. At 12 m. free, but not profuse, perspiration over whole body; salivation very abundant; pulse, 108; temperature, 99.5°. At 12.15 flushing had passed off; no contrac-

tion of pupil or disturbance of vision; no increase of nasal or lachrymal secretions. At 12.30 less perspiration, but salivation still very free; pulse, 100; temperature, 99.8°. At 1 p. m. skin merely moist and salivation much diminished; pulse, 88; temperature, 99.4°. At 2 p. m. skin natural and no salivation; pulse, 80; temperature, 99°. No effect produced on bronchial secretion, and no pain over pubes. Stomach not at all disordered. Saliva twelve fluid-ounces.

October 1.—At 10 a. m. pulse 78; temperature, 99°. Slept well; has good appetite, and feels lighter and freer from pain.

October 5.—Patient has improved, but still feeling some soreness has requested another dose, which was given at 3.30 p. m. Before taking medicine pulse 80; temperature, (in mouth,) 98.6°. Flushing of face at 4.05 p. m.; salivation and sweating both profuse; pulse, 96; temperature, 99.5°. At 5 p. m. salivation and perspiration continuing as before; pulse, 108; temperature, 100. At 7 p. m. action on skin and salivary gland still continues; pulse, 112; temperature, 99.7°. At 9 p. m. action entirely ceased; skin natural; pulse, 90; temperature, 99°. Total amount of saliva, thirteen fluid-ounces.

October 6, 10 *a. m.*—Feels quite well, and has scarcely any pain or soreness; pulse, 84; temperature, 99.

F. M——, æt 35, syphilis consecutiva. Had chancres two years ago. Now troubled with ulcerations in mouth, nose, and urethra; pain and feeling of constriction about frontal sinus; occasional pain in chest, dryness of skin, and scaly eruption on arms and thighs.

Took dose of fluid extract at 1.30 p. m., at which time pulse was 77 and temperature 97°. At 2 p. m. flushing of face, moisture of forehead, and saliva collecting in mouth; pulse, 81; temperature, 99.5°. No change in pupil. At 2.30 perspiration over whole body; saliva, three fluid ounces; pupils slightly contracted; pulse, 90; temperature, 99.7°. At 3 p. m. perspi-

ration still free; saliva increased to six fluid-ounces; pulse, 93; temperature, 100.2°. At 3.30 perspiring chiefly on face, legs, and feet; saliva amounts to eight fluid-ounces; pulse, 94; temperature, 100.2°. At 4 p. m. perspiration continues, and saliva measures ten ounces; additional contraction of pupil; pulse, 92; temperature, 100.1°. At 4.30 diminished amount of perspiration; saliva, twelve ounces; pulse, 90; temperature, 99.5°. At 5 p. m., still less perspiration; saliva, thirteen ounces; pulse, 82; temperature, 99.4°. At 5.30, skin merely moist; salivation, fourteen ounces; pulse, 80; temperature, 99.25°. At 6 p. m. skin nearly natural; salivation had ceased; pulse, 80; temperature, 99.1°. There was no disturbance of vision or nausea, and but slight paleness as action of medicine began to decline. The patient took a second dose on the afternoon of the 5th instant, with almost precisely the same effect throughout on the pulse and temperature as noted in the first administration. Quantity of saliva the same, namely, fourteen ounces.

October 6.—Patient says there is decided improvement in the condition of his skin, which has gradually become moister since the date of the first trial. Sleeps well; appetite good, and has less pain.

In a third case of syphilitic disease, in which the feet were likewise the seat of rheumatic pains, occasioning great discomfort during the day and loss of sleep at night, so much relief, lasting for six days, was afforded by the administration of the drug, on the 27th of September, that on the 5th instant the dose was repeated, with the effect of again relieving the pain and affording rest at night. In this case likewise the temperature on both occasions continued to rise until the action of the medicine reached its maximum, and then gradually declined as the perspiration and salivation diminished, until, at the cessation of the action, it stood nearly at the point indicated before the medicine was taken. Another patient, suffering from or-

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chitis,' incipient bronchitis, and whose pupils were largely dilated, afforded the opportunity of testing the efficacy of the drug in several particulars at the same time. A fluid-drachm of the fluid extract was given, and in about twelve minutes there was flushing of the face, augmentation of the lachrymal secretions, and profuse salivation and perspiration. After the lapse of an hour the pupil was considerably contracted. The pulse in this case rose from 88 to 120, and the temperature from 99.7° to 103.1°. The next morning the pain had entirely disappeared from the testicle, the cough had vanished, and the patient is now in a fair way to recover without further treatment. The almost immediate improvement in the general symptoms of a case of pneumonia occurring in the practice of a friend has led both of us to the conclusion that jaborandi will furnish a powerful yet safe means of moderating and modifying febrile action. A case of subacute rheumatism of the ankle-joint, of six weeks' duration, occurring in hospital practice, two doses of jaborandi were administered, and so completely removed the pain and soreness from the affected part that on the third day from the time the second dose was taken the patient was discharged from the institution cured. In three cases of chronic rheumatism, in each of which the jaborandi has been taken twice, the pain was in every instance relieved for periods of different length after each administration, but whether the permanent removal will be effected by continuing the use of the drug at intervals is a question to be yet decided. The opportunity of testing the antagonism between atropia and jaborandi occurring, in the case of a patient whose pupil had been dilated for ophthalmoscopic examination, about a grain of a soft extract, made by evaporation of the tincture, was rubbed up with a little glycerine and painted around the orbit. In half an hour the pupil had contracted very considerably, and, at the end of two hours, it had returned to its natural size. Since then, I have

tried the effect of the extract on the pupil in its natural condition, and, in four out of five cases, found that it produced more or less contraction.

The above, with the addition of the trial of its effects on two healthy adults, in whom drachm doses produced the expected results, but without any points deserving special mention, although not presenting a formidable array of experiments, still show such certainty and uniformity of action that it must be conceded that jaborandi possesses the properties claimed for it by Dr. Continho, namely, those of a powerful yet safe sialogogue and sudorific.

In the main features, my observations of the effects of the drug coincide very closely with those already recorded. In no case has either perspiration or salivation been wanting, although they have varied considerably in quantity. In several cases the salivation amounted to twenty fluid-ounces, and in no case did it fall below six ounces. The perspiration was profuse in the great majority of cases, and in the remainder quite free. The pulse invariably rose during the action of the medicine. The temperature followed the same rule, except in one case, namely, in that of the patient with subacute rheumatism, when there was a lowering during the height of the action. This fall was accompanied by very decided pallor, nausea, and hiccough, that persisted until the effects of the medicine had passed off. As the action decreased, the temperature returned to the point noted before the administration. As confirmatory of the observations of Robin, with which mine agree, it may be well to state that Rabuteau, in his own case, found the temperature highest when the medicine was acting most powerfully; that Ambrosoli also records a rise of some tenths of a degree, and that Riegel likewise acknowledges a primary increase in this respect. Diarrhœa did not occur in a single case. Increased secretion was not remarked in a single case from the nasal mucous membrane,

and augmentation of the metrazol in only two or three. Prior use not remarked in the great majority, while the resulting depression was invariably slight.

Two interesting experiments in regard to the physiological action of [illegible] have been reported to the Biological Society of Paris by M. Carville, and valuable contributions on the same subject have been furnished by Mr. Langley, of Saint John's College, Cambridge. An account of these researches will be found in the London Medical Record for December 15, and the British Medical Journal for February 20, 1875.

REPORT ON CAÑA AGRIA, A REPUTED SPECIFIC IN DIABETES.

By JOHN C. SPEAR, M. D.,
SURGEON U. S. NAVY.*

Being in the city of Guayaquil, in the month of July, 1873, I was informed by the governor, Señor Don Vicente Santistevan, that there had been lately discovered in Ecuador a specific for diabetes. The remedy is an indigenous cane, called in Ecuador *caña agria*. The governor stated that he knew of his own personal knowledge of three cures effected very recently by this plant, and he gave me a lot of it, with a request that it might be tried, in the treatment of diabetes, by American physicians.

Subsequently I called upon the leading physician in Guayaquil, Dr. A. Destruge, an educated and respectable practitioner, who very kindly, at my request, prepared a short statement of what he knew of *caña agria* as a cure for diabetes. A copy and a translation of his statement are appended.

In conversation the doctor expressed a very favorable opinion of this new remedy in the treatment of diabetes, and said it was his intention to give it a further trial in his practice.

Caña agria is administered either in decoction or infusion; and also when the plant is green the expressed juice is sometimes used.

In an examination of the expressed juice made on board this ship (Omaha) oxalic acid and numerous starch-granules were

* Attached to the U. S. S. Omaha, South Pacific Squadron, 1873.

found. *Caña agria* is found growing wild along the water-courses in many parts of Ecuador. In general appearance it is very like our common sugar-cane.

I have not had an opportunity to use it on board ship, nor is it likely I shall have one. The matter seems to me to be of sufficient importance to warrant me in forwarding a lot of the cane to the Bureau of Medicine and Surgery, in order that it may be properly tried in the United States. I regret that, being only one day in Guayaquil, I had no time to gather further information concerning this interesting subject.

COQUIMBO, CHILI, *August* 28, 1873.

[The following are a copy and a translation of the letter of Dr. A. Destruge, of Guayaquil.—H. C. N.]

[Copy.]

GUAYAQUIL, 20 *de Julio*, 1873.

El nombre vulgar de la planta es *caña agria*. Solo sé que el primero que hizo uso de esta planta para curar la diabetes fué el doctor M. Villavicencio, autor de la Geografia del Ecuador. El doctor estruvo mucho tiempo entre los Indios del Napo, y probablemente allí obtuvo de dichos Indios conocimiento de las propiedades medicales de la *caña agria*.

El doctor Villavicencio sufrió de diabetes, usó la *caña agria*, pero no me consta que hubiera sanado; solo sé que el murió de *ramollissement* del cerebro; y creo que la diabetes solo fué sintomatico ó efecto de la alteracion organico de la masa del cerebro, alteracion que directamente ó por accion refleja obraba sobre las secretiones de las riñones y augmentaba en la economia la formacion del azúcar, de un modo ó otro.

El unico caso que conozco de cura hecha por el uso de la *caña agria* es la del señor Federico Cornejo, socio que fué de la casa de los señores José Rorales & Ca., de esta plaza. El señor

Cornejo ha saguido el tratamiento de la *caña agria* durante seis meses por la minos.

Sé que en Lima ha sido examinado la planta, y que la unica sal encontrada es el oxalato de potasa.

A. DESTRUGE, *M. D.*

[Translation.]

The vulgar name of the plant is *caña agria.* I only know that the first person who made use of this plant as a remedy in diabetes was Dr. M. Villavicencio, the author of the Geography of Ecuador. The doctor was a long time among the Indians of Napo [river,] and probably there obtained of said Indians knowledge of the medical properties of *caña agria.*

Dr. Villavicencio suffered of diabetes, and used *caña agria*, but I cannot state with certainty that he was cured; I only know that he died of softening of the brain; and I believe that the diabetes was only symptomatic, or the effect of organic alteration, which, directly or by reflex action, worked upon the secretions of the kidneys, and augmented in the economy the formation of sugar in one way or another.

The only case I know of a cure made by the use of *caña agria* is that of Mr. Frederick Cornejo, late partner of the house of Messrs. José Rorales & Co., of this city. Mr. Cornejo pursued the treatment of *caña agria* during six months at least.

I know that the plant has been examined in Lima, and that the only salt found is oxalate of potash.

A. DESTRUGE, *M. D.*

GUAYAQUIL, *July* 20, 1873.

[On receipt of the specimen of *caña agria* transmitted by Surgeon Spear, the Surgeon-General of the Navy forwarded it to the director of the United States Naval Laboratory at Brooklyn, N. Y., with a copy of the communication from Dr. Spear, and directed him to "make such an analysis of it as the means

at his disposal would allow, and also ascertain the best mode of preparing it for use."

The following is the report of the director of the laboratory:

"The specimens received were portions of the stalk of the plant, and resemble the common sugar-cane.

"No sugar, however, could be detected, while, on the other hand, starch was present in large quantities.

"Microscopic examination showed nothing unusual, excepting a considerable thickening of the walls of the epidermic cells, leaving irregular central spaces, which might easily be mistaken for crystals.

"Chemical analysis showed the presence of carbonic acid, in combination with soda, potassa, lime, and magnesia; of sulphuric acid, probably, combined with lime; of ferric phosphate and silicic acid. Neither iodine nor oxalic acid could be detected. Such crystals as were observed in the parenchyma of the stalk were supposed to be sulphate of lime.

"Three fluid extracts have been prepared as follows:

"1. One hundred and twenty-five grams of powdered and dried *caña agria* were extracted with alcohol of sp. gr. 0.8322. The alcohol gained in weight 3.55 grams.

"2. One hundred and twenty-five grams extracted with alcohol of sp. gr. 0.9126. The alcohol gained 4.7 grams.

"3. One hundred and twenty-five grams extracted with alcohol of 0.9427. The alcohol gained 6.10 grams.

"By these experiments it appears that the plant does not give up much of its weight to strong alcohol; the greatest gain in weight being found with the weakest menstruum."—H. C. N.]

REPORT ON COCA OR CUCA.

(*Erythroxylon coca.*)

By BENJAMIN F. GIBBS, M. D.,
SURGEON U. S. NAVY.

While on a visit in the vicinity of Tacua, distant forty miles from Arica, Peru, I procured a good specimen of the leaves of the coca, or cocua, as it was formerly called. The plant is described in the books as *Erythroxylon coca*, and reference is made also to its wonderful properties in enabling the native Indians to pass several days without food and undergo great fatigue. In regard to this, I find they always eat at night. It is prepared by chewing the fresh leaves and mixing with lime. This mixture is used as a masticatory, much in the same manner as the natives of the East use the betel-nut. The plant bears some resemblance to the *Thea bohea*, as I have seen it in the Bohea Hills above Foo-Chow, China, both in size of the plant and shape of the leaves. The latter are, however, in the tea-plant serrated on their edges, while these are smooth, with parallel veins. The veins of the leaves of the tea-plant are reticulated. The coca-plant grows from 4 to 6 feet high, and is largely cultivated in Bolivia. The properties ascribed to it are directed more to the nervous system, and are said to increase the contractile force of the heart. It apparently aids in causing the extraction of the largest amount of nutriment from the least quantity of food. The natives carry with them, for the longest day's journey over the mountains, but a few handfuls of parched corn, and are sustained by the increased nutriment they procure by chewing the coca and swallowing the saliva.

I am inclined to believe that the great virtues ascribed to the coca arise from the direct stimulation of the cardiac muscular fiber. This stimulation is demanded during these mountain journeys through the most rarefied atmosphere. These journeys often oblige them to pass through altitudes ranging from 15,000 to 20,000 feet above the sea. The journey from Tacua to La Paz, one hundred and twenty miles, obliges the following of a trail which passes an altitude of 17,000 feet. External hemorrhage through the mucous membranes is not uncommon, called the "sorochi." Nervous stimulants afford relief; and in this light we may very reasonably conclude that the coca finds its greatest value in assisting the natural force of the heart to make its greatest effort to enable the Indians to pass the summit of the Andes.

I am preparing an alcoholic extract made from the leaves, and shall make further experiments with this drug.

ARICA, PERU, *June* 16, 1875.

ANEURISM OF THE ARCH OF THE AORTA.

(Treatment by galvano-puncture.)

By A. S. OBERLY, M. D.,
SURGEON U. S. NAVY.

Thomas A. Shock, chief engineer United States Navy, aged forty-one, of slender development, was admitted to treatment of aneurism of the arch of the aorta, at navy-yard, Boston, October 21, 1872, with the following history of his case:

He stated that he was the youngest child of a numerous family of children; that his mother died of cancer, and that it had been his misfortune to inherit a feeble constitution. Though not robust, he enjoyed fair health until he entered the United States Navy; and while third assistant engineer, and attached to the United States steamer Susquehanna, from 1851 to 1855, he had his constitution injured from being compelled to breathe a confined and vitiated atmosphere while occupying quarters on the orlop-deck. From the ill-effects of the above cruise he said he never entirely recovered, though he did not wish to consider himself invalided, and continued doing duty.

While attached to the United States steamer Contoocook, in 1868 and 1869, he suffered a great deal from exhaustion, but he kept on duty until after some break in the machinery of the vessel, which required more labor than usual, and from the effects of over-exertion he never recovered. From the prostration which ensued stimulants were required to keep him alive, and it was supposed by the surgeon of the ship that he was suffering from the effects of phthisis.

After leaving the United States steamer Contoocook he fared tolerably well on shore again, but in 1870 he had several attacks of suddenly losing his senses and falling down while passing from place to place; but as he recovered quickly, no special attention was given to the fainting. Save occasional attacks of coughing and palpitations of the heart, his condition continued much the same until the latter part of 1871, when he had more or less debility and emaciation of the limbs. Thinking he might develop his wasting muscles, he sought exercise in Dr. Winship's gymnasium, but no relief followed.

Early in 1872 he applied for treatment of his cough and prostrated condition, and desired to know the chances of his taking additional life-insurance. At this time there was marked dullness in the apices of both lungs, as also a deep-seated dullness in the infrascapular region of the right side near the sternum. Not knowing fully his previous history, I was inclined to think that phthisis had made its appearance, and gave him directions for treatment accordingly, and told him that it was not probable that application for life-insurance would be favorably considered.

As he suffered periodically from paroxysmal coughing and debility, he was wont to obtain advice indifferently, now from one physician and anon from another. During one of his attacks in May last he applied to Dr. Ellis, of Boston, from whom he received the opinion that he was suffering from aneurism of the aorta. From this time the months passed by with comparative comfort until October, when he commenced to suffer from incessant cough and debility, for the relief of which medicine proved of but little avail; besides, at this time the aneurism commenced to show pulsations in first intercostal space, an inch or more from the sternum. Owing to prostration and the already emaciated condition of body, reducing treatment could not be

insisted on, neither was he willing to submit to quiet and relief from duty. October 21, 1872, being so reduced as no longer to be able to move around, he consented to keep in the house, but on receiving no hope of recovery, with the probability of his dying suddenly sooner or later, he desired to undergo any kind of treatment that promised hope, even should it prove delusive. Being directed to Dr. H. I. Bowditch, of Boston, electricity was suggested as the only thing that offered hope; and though but little was promised therefrom, he desired that he might enjoy this in his case. On making a thorough examination at this time, I found the patient was suffering from one of his periodical attacks of incessant coughing and exhaustion, and which he mentioned to be several days in duration. Inspection showed him to be greatly emaciated, and with a pulsating tumor of small size an inch to the right of the sternum, in the first intercostal space; but no bruit could be detected by auscultation, and the respiratory sounds were indistinct over the seat of the pulsating tumor. He was ordered a prescription containing iron, strychnia, and morphia, and instructed to remain, as far as possible, in a perfect state of rest.

By the 25th of October the cough had nearly disappeared, and he began to enjoy comfortable nights and a fair appetite.

From October 25 to November 10 there was but little change in his condition, save, on lying in bed, attacks of dyspnœa and coughing would appear, to allay which he was directed to sit while sleeping, and to take paregoric in small doses.

November 12.—Drs. Bowditch, Warren, and Putnam, of Boston, came prepared to use galvano-puncture, in view of a radical cure. Accordingly, at 10.21 a. m., after the external parts had been benumbed by rhigoline, three needles were plunged an inch and a half deep over the tumor, in the first intercostal space, and eighteen cells of a Stöhrer battery applied for fourteen and a half minutes—the positive pole to the needles and the negative to the left side of the chest.

At the commencement of the operation the patient was semi-recumbent and inclined to his right side, seemingly suffering very little pain on the introduction of needles. The pulse was about 75, weak, and subject to variations, in consequence of the impending operation.

Three minutes after the beginning of current, pulse 76, and slightly weaker; five and a half minutes, pulse 92, weak; eight minutes, pulse only 84, and much fuller than at the beginning; eleven minutes, pulse weaker and 96; at fourteen and a half minutes, pulse 108, very weak and scarcely perceptible. At the same time the operation was discontinued and the needles withdrawn, the head lowered, brandy administered, and fresh air freely admitted. For a couple of minutes after the discontinuance of the operation the pulse was almost imperceptible and the patient in a fainting condition. Reaction, however, returned quickly, and the weak pulse gained strength, and kept for about three hours at 72. At 3 p. m. was quite comfortable; pulse 84 and full; skin warm, with a feverish tendency.

Throughout the operation the patient was perfectly rational, the last two minutes only excepted, and would reply to questions, stating the burning and prickly character of the sensation caused by the operation and the acute pain experienced in the right lumbar region.

He was directed to keep the recumbent position in bed, and by no means attempt to get up; to be allowed drachm doses of paregoric, with brandy, and to comfort himself with a diet of beef tea and farinaceous articles.

November 13.—Passed a comfortable evening and night, with but little cough; sleeping at intervals; compelled to lie on his right side, and on making a change to the left was provoked to cough. This morning, condition as during yesterday afternoon, save that he has soreness at the place of insertion of needles. Has

a pulse of 84, good, with a normal skin. Says he has had no chill or feverish symptoms, but that since the operation he has been unable to void his urine. Has a good appetite; took a couple of drachms of paregoric during the night. 11 a. m.—Catheterized, and withdrew twenty-four ounces of high-colored urine.

November 14.—Comfortable yesterday during the day, but restless the first part of the night, and had to take several doses of paregoric and brandy. This morning, pulse 80; comfortable; bowels torpid. Ordered pil. laxat., iij.

November 15.—Restless and anxious this morning, and says he has had the most miserable night yet. Suffered from neuralgic pains, extending from tumor to base of lungs and to right scapula, and for which he had to take several doses of paregoric. 3 a. m.—Suffered from dyspnœa.

At present has a moist skin; pulse 90, weak; continuous pain; no action from bowels; urine passed freely.

November 16.—After giving an enema and applying a sinapism below the nipple his condition improved, and he felt pretty well throughout yesterday, and passed a fair night in a semi-recumbent position. Is sitting in bed this morning complaining of a pain darting from the right nipple—the right scapular region—and that he cannot move in consequence. Has no fever; skin is cool; pulse fair. Ordered sinapisms pro re nata, applied as directed above.

November 17.—Restless; suffers from considerable pain in the scapular region. Between 11 a. m. and 12 m., Dr. Bowditch was present to renew the operation by electro-galvanic needles. On examination the thoracic walls were decided to be more firm, but there was an apparent increase in the size of the tumor. Three needles were introduced near the same locality of the former operation, between the first and second intercostal space, but slightly deeper than before, and twenty cells of a Stöhrer battery, with deviation of thirty-three, applied. The pulse

before the operation ranged from 90 to 96, good; two minutes after the current was started, pulse 96, fair. Two more cells were added, and four minutes from the beginning the pulse remained unchanged. Twenty-eight cells, (the full force of a Stöhrer battery,) with a deviation of forty-five, were now applied. Six minutes from the commencement of the operation pulse yet 96, but weak; eight minutes, pulse 96, fuller; ten minutes, 90, fair; deviation of needle, 46; twelve minutes, pulse 96, almost imperceptible, and patient faintish; cells reduced to sixteen; fourteen minutes, pulse 80, very weak; fifteen minutes, pulse 84, fuller. Operation was here stopped, and the needles removed, with a gradual improvement after taking brandy—the operation having been readily sustained and better than before, though, instead of suffering in right lumbar region, the right scapula pained greatly.

November 18.—Pain in scapula, which diminished a couple of hours yesterday, returned last evening. Ordered ex. hyoscyami.

November 19.—Passed a nervous, restless night. Tumor larger, firmer, with less impulse. Ordered hydrate of chloral and pot. bromid.

November 20.—Restless and delirious during the night; says the medicine was the cause.

November 21.—Tumor increasing rapidly; unable to lie in bed. Slept four hours last night by sitting in a chair and resting his head against a stand.

November 25.—But little change in his condition for the last few days. Unusually restless, with considerable pain in the right scapular region. Manages to get about five hours' sleep during the night by frequently changing his position.

November 26.—There is apparently a diminution in the size of the tumor, but the impulse is more distinct and the walls of the chest less firm. For the first time, can detect a slight bruit. Takes no medicine; enjoys a tolerable appetite.

December 2.—No change within the last week.

December 5.—Tumor diminishing, but impulse more apparent at edges of hardened walls. Has but little cough; can lie on the left side.

December 7.—Increase of cough and dyspnœa. Instead of coughing while lying on the left side, as for months past, he is now inclined to cough while on the right side.

December 9.—Very nervous, and subject to violent displays of temper, seemingly unable to brook the restraint of being within doors.

December 13.—Suffers considerable pain through the region of the tumor during the night, and is very nervous and restless. Is losing strength.

December 15.—By frequent changes of posture he is able to get several hours' rest, but not without taking valerian and pot. bromid. to allay nervousness.

December 19.—Is failing in strength, and again disturbed with cough and pain through tumor.

December 21.—Nights restless and uncomfortable, with much pain and coughing. Is very despondent, and says he cannot endure his condition and indefinite suspense of recovery much longer. Ordered a teaspoonful, *pro re nata*, of the following medicine: ℞. Morph. sulph, gr. j; pot. bromid., ʒj; ex. valerian. fl., ʒj. M.

December 25.—From the use of morphia, he seems to be tolerably comfortable, with but little cough and dyspnœa. This morning thoracic pain returned, as also the wheezing. Region of dullness over aneurism greater, and especially downward and outward.

December 28.—No change, save dyspnœa worse. Ordered to apply flannel saturated with tr. opii over tumor, and to cover with oil-silk.

December 30.—Has had severe paroxysms of coughing and

dyspnœa the last two mornings. Irritability of temper increased, with more or less mental delusion. Pain from tumor to right scapular region quite acute. Has no appetite; left leg edematous; tumor increasing in size. Ordered morphiæ sulph., gr. ij; potassii bromidi, ʒj; ex. valerian. fl., fʒj. M. S. Teaspoonful *pro re nata.*

January 2, 1873.—Considerable relief from pain and dyspnœa for the past few days. Last night pain increased. Ordered two leeches applied to thorax.

January 3.—Passed a restless evening, with severe paroxysms of coughing and dyspnœa. Applied more leeches, but no relief followed their use. By the use of morphia passed the night tolerably well. Tumor increasing in size rapidly, interfering seriously with the functions of the right lung. Feet considerably swollen.

January 6.—Tumor enlarging in every direction, with marked embarrassment of the functions of the right lung. Suffers acutely from pain in the right scapular region, and says that, "from the feeling, great changes are going on within." Relief from pain obtained only by hypodermic use of morphia in scapular region.

January 8.—Failing quite rapidly. Legs greatly swollen; right arm and hand markedly so. Tumor more prominent externally, though thoracic walls pretty firm. Has paroxysms of acute pain and dyspnœa, with considerable weakness of pulse—at times scarcely perceptible at wrist, and least so in right arm.

January 10.—Suffers from dyspnœa and dysphagia. On attempting to lie down in bed yesterday he almost suffocated—ears, lips, and face becoming livid. Almost pulseless at times. Feet and legs greatly swollen; right arm and face slightly. Obtains relief from pain and dyspnœa from the hypodermic use of morphia.

January 13.—Thorax on right side edematous and much enlarged. Suffers from paroxysms very much like asthma; at times with same sibilant râles.

January 15.—Paroxysms of dyspnœa increasing. Mind wandering.

January 17.—Legs, arm and thorax on right side, more edematous. Suffers a great deal from dysphagia. Between 12 m. and 1 p. m. yesterday he had a severe attack of dyspnœa, bringing on lividity, gasping, and weak intermittent pulse. After a paroxysm of twenty minutes he fell asleep, breathing deeply, with but nine respirations to the minute, which continued until this morning. Refuses to eat, in consequence of painful deglutition and anorexia. Cannot detect any respiratory sounds in his right lung. Pulse 100 to 108, weak, and not perceptible in the right radial artery. Has but little pain, in comparison with the past, and does not require any medicine for relief.

January 19.—Had several paroxysms of dyspnœa, with lividity and imperceptible pulse, the last two days; but this morning there is more or less profound sleep, with but four respirations to the minute. Has taken neither food nor medicine the last day. Strength failing; unable to speak audibly.

January 20.—Since yesterday he has been resting on his right side, in his chair, in a stupid condition; breathing at times comatose; œdema of the thorax subsiding.

January 21.—Roused a few minutes yesterday forenoon and took some milk-punch, but relapsed again into a quiet comatose condition, not changing his position from the semi-recumbent on the right side or moving until death, at 8.45 this morning. Has had no paroxysms of dyspnœa the last thirty-six hours, and death ensued without a struggle. The external thoracic swelling commenced to subside from the time the dyspneal paroxysms stopped. During the last fortnight he could not lie in bed, and passed all his time in a reclining-chair, resting his

head on a stand in front, or else lying on his right side supported by pillows.

Autopsy, twenty-five hours after death.

A fusiform aneurism, of a pint capacity, was found in the ascending part of the arch of the aorta, and adherent to the thoracic parietes, having eroded the second and third ribs, and caused extensive bronchial ulceration, with much congestion of œsophagus. There was also extensive pleuritic adhesion and effusion in the right side. The right lung was greatly congested, and in the apex were signs of previous chronic pneumonia. In the apex of the lung there was an old cicatrix, with small nodules of a dark slate-color, and fibroid deposits; the lung otherwise healthy and filled with air. The liver, spleen, and kidneys were healthy, but rather bloody; heart flabby, and surrounded with normal amount of adipose matter. On an examination of the aneurism it was found entire, and, in the interior, there were no signs of any adherent clots from electricity, neither were there any indications of its use anywhere. The aorta appeared healthy aside from the place of enlargement, and in the formation of the tumor does not seem to have given way in any one point. Aortic valves were healthy.

The above is a succinct account of the case, and there remains but little to add in conclusion. While the early diagnosis was faulty, there was some excuse, as shown by the *post-mortem* examination.

In regard to the use of electricity, the operation was better borne than was anticipated, and the pain was not specially acute; neither were there any ill-effects from the needles, as no blood escaped on their withdrawal, and the wounds healed in a couple of days without any ulceration.

From the progress of the case and from *post-mortem* exhibit, treatment by galvano-puncture has failed to fulfill its expectation, though, perhaps, it might be made serviceable in the treat-

ment of aneurisms more remote from the heart. In this instance, its use in the aortic arch has not added sufficient encouragement to warrant a repetition of the operation, and which has, as far as known, been the first time of its performance in this country.

A CASE OF PERITONITIS

RESULTING IN

ABDOMINAL ABSCESSES, WITH PERFORATION OF THE SMALL INTESTINES.

REPORTED BY WILLIAM M. KING, M. D.,
SURGEON U. S. NAVY.

Joseph Cowell, corporal of marines, æt. 22, native of Ireland, enlisted in New York, December 20, 1869, was admitted into the United States Naval Hospital, Yokohama, Japan, September 4, 1873, with acute peritonitis. This patient was received from the United States steamer Idaho, at Yokoska, Japan. The following is a synopsis of the history of the case from the commencement of the disease and prior to admission to this hospital:

Patient came under treatment on the morning of August 17, 1872. On admission complained of abdominal tenderness, especially referred to umbilical region. Bowels loose; skin hot and dry; great thirst; pulse, 100. Ordered effervescing mixture.

August 18.—Pulse, 88; temperature, 102°; increase in severity of symptoms.

August 19.—Has been extremely restless all day. He complains more of distress than definite pain in the abdomen, but, on pressure, there is considerable tenderness, especially in umbilical region. Temperature, 104°; pulse, 118; bowels loose. Ordered the following prescriptions: ℞. Pulv. ipecac. comp., grs. xij, statim. ℞. Tr. aconiti, gtt. vj; aquæ, ℥iv. A tablespoonful every hour through the night.

August 19.—Appears to be slightly better. Has some anorexia, thirst, and continuance of abdominal tenderness. R. Ammon. acetatis liq., ℥ss, every third hour. R. Opii pulv., grs. iij; bismuth subcarb., grs. xx. In chartulas sex dividendus. One powder an hour and a half after each dose of liq. ammoniæ acetatis. Diet, tea and toast, arrowroot, and beef-essence.

August 31.—During the past fortnight Cowell's condition has varied but little, some days slightly better, generally followed, however, by an increase in severity of symptoms heretofore mentioned. Abdominal pain and tenderness apparently most severe in the left umbilical region; decubitis invariably on the right side; slight diarrhœa of a light-yellow color; anorexia, with occasional vomiting of ingesta; considerable meteorism. Temperature has been about 102°, with pulse varying, 88 to 100. Treatment has been diaphoretic, with occasional use of hypnotics, to relieve pain and promote sleep; fomentations to abdomen from time to time. Diet, beef-essence, arrowroot, tea and toast.

September 3.—At 3.30 a. m. patient had a severe chill, lasting twenty minutes, followed by fever and profuse perspiration. Pulse at the time, 110; temperature, 106.5°. Upon examination of abdomen this morning found it covered with sudamina.

September 4.—Upon entrance into the hospital the patient was quite emaciated. Had considerable fever; temperature, 99.5°; pulse, 104; respiration, 16. His abdomen was very tympanitic, and was troubled with severe pain in right iliac region. There was no evidence of eruption. His tongue was very red and covered with whitish fur; bowels open and stools of ocherous color; the urine scanty and high-colored. He has so much pain in the abdomen that morphiæ sulph., grs. ¼, was administered subcutaneously.

September 11.—During past week pain has continued very severe in right side, for which morphiæ sulphas, gr. ¼, has been

administered morning and evening. Pulse, 108; respirations, 18; temperature, 100.6°. The condition of the tongue and distension of the abdomen have remained the same. Patient has been taking milk with sherry wine, *ad libitum*.

September 18.—Patient has been growing weak. To-day, for the first time, slight indications of wandering of the mind. Pain in abdomen has shifted from right to the left iliac region. Meteorism excessive, for which ordered mistura terebinthinæ. Diet, milk-punch, beef-essence, *ad libitum*. Continue hypodermic injections of morphiæ sulph. Pulse at 9 a. m., 106; respirations, 20; temperature, 101°.

September 22.—There is slight excoriation under right hip. Ordered simple dressing. Symptoms have continued as before, with exacerbation of abdominal pain toward evening. Add to each dose of mist. terebinthinæ, tr. opii, gtt. xx. Discontinue hypodermic injection.

September 29.—Patient continues in same condition. Opiates from time to time to relieve abdominal pain. Marked meteorism. Taking milk-punch, arrowroot, and beef-essence, with but little relish. Slight bed-sore nearly healed; continue dressing.

October 7.—Patient gradually becoming more emaciated and anemic. The abdomen greatly distended, and seems to indicate the presence of a tumor, located principally in left iliac region. The pain seems to be paroxysmal morning and evening, only controlled by hypodermic injections of morphiæ sulphas, which have been resumed. Discontinue mist. terebinthinæ.

October 14.—Symptoms continue the same. Pain so severe as to necessitate use of hypodermic injections of morphia.

October 21.—During past week has been suffering with violent attacks of vomiting of frothy, ill-smelling, brownish liquid; the tumor entirely disappearing. His appetite since has somewhat improved.

October 22.—Had a copious stool last night, passing about

three pounds of fæces of a bright-yellow color. Patient is feeling better in consequence this morning. Meteorism has disappeared.

October 29.—Gradually becoming weaker and more emaciated. Pain very severe, so that it requires from four to five hypodermic injections of morphiæ sulphas daily to relieve suffering. No tumor discoverable at present.

November 5.—Pulse 102, very weak. Appetite remains fair. Takes one bottle of beer daily, with nourishing diet.

November 10.—During past week has vomited everything eaten, generally within one hour after taking meals. At times vomiting has been stercoraceous. Continue treatment. The bed-sore, which never fully healed, is growing worse, becoming enlarged and inflamed. Decubitus, since commencement of illness, always on right side.

November 19.—Emaciation progressive. Patient is scarcely more than a mass of skin and bones. Muscular tissue has so thoroughly disappeared as to render some of the smaller muscles scarcely discernible; the larger ones appear to be the size of small cords. Abdomen flaccid. Considerable induration of intestines about two inches from the median line of the abdomen, and about an inch and a half from and above the umbilicus on the left side. Patient passes fæces naturally, though of small quantity, with an interval of one or two days between his stools. Voids urine with difficulty, about ten ounces in the twenty-four hours, depending upon the quantity of liquid taken. Has been taking beer to the extent of a bottle to a bottle and a half per diem. Hypodermic injections of morphiæ sulph. to the extent of a grain and a half in twenty-four hours, and, in consequence, has had some sleep. Pulse weak, 84; temperature, 96.5°; respirations, 16.5. Patient's case is hopeless, and he appears to be dying of marasmus. Generous diet, milk-punch.

November 20.—Patient appears to be more cheerful to-day.

Had a stool last evening, very light in color, and of small quantity. Intense abdominal pain, only relieved by morphiæ sulph. Milk-punch *ad libitum*.

November 25.—Vomited day before yesterday, after an intermission of this symptom for some days. Pulse 98, and respirations 16 per minute.

November 30.—Abdominal pain more severe and continuous; vomited several times during the past few days brownish, frothy fluid. Has taken as much as one and three-fourths of a grain of morphiæ sulph. during twenty-four hours to relieve pain. On the 27th and 28th, had copious movement of bowels. Upper and lower extremity of left side commenced to become edematous on the 25th. Patient had an involuntary motion of the bowels last evening, and is gradually approaching his end. Temperature has fallen to 94°. Has lost all energy, and remains in a condition of apathy, though still quite conscious.

December 1.—Patient gradually sank and expired at 3.22 p. m., having been unconscious for more than three hours.

Nineteen hours after death a *post-mortem* examination was made. Body very much emaciated; *rigor mortis* but slight. Extensive adhesions of peritoneum anteriorly and posteriorly. In left hypochondriac region, about three and a half inches from median line of abdomen, under cartilages of the ninth, tenth, and eleventh ribs, agglutinated by thickened peritoneum to the internal surface of abdomen, and posteriorly to the small intestines, which thereby formed its walls, an abscess was found. The abscess contained about three drachms of pus, and communicated with jejunum by a circular opening one-half inch in diameter. The edges of this opening were smooth and rounded, and it had evidently existed for some weeks. The mucous membrane, at a point surrounding the perforation and beyond it, was softened and disorganized. Further examination of the small intestines revealed extensive adhesions, liter-

ally binding them together into a solid mass, and this condition evidently having prevented natural peristaltic action. An extensive abscess in right iliac fossa was discovered, extending across the hypogastric region posterior to the bladder and ending close to the rectum, forming a *cul de sac*. The ileum, near its juncture with the cæcum, was adherent to the walls of the abscess, which may be said to have been formed by thickened and diseased peritoneum, was perforated and in communication with the abscess. The mucous membrane surrounding the perforation was thoroughly disorganized.

Peyer's patches, normal.

Stomach, normal.

Pancreas, small size; weight, two ounces.

Spleen, of small size; weight, two ounces.

Liver, small and congested; weight, thirty-one ounces.

Left kidney, weight, five and three-quarters ounces.

Right kidney, weight, four and one-half ounces.

Enlargement of suprarenal capsule. Fecal matter weighed twenty-six ounces.

The above case is one involving many points of interest. It will be observed that the disease was of long duration—three and a half months; that suppurative inflammation occurred with the formation of two distinct abscesses in the abdominal cavity at distant points, which abscesses opened into the small intestines; and that the natural peristaltic action of the intestines was virtually paralyzed by the extensive adhesions which existed. The autopsy, which was made with great care, revealed most extensive visceral disease. The most remarkable feature of this case is the extraordinary powers of vitality possessed by the patient, and that he lived for so long a time with such internal disorganization.

A FIBROUS SACK, CONTAINING PUS, FOUND WITHIN THE CRANIUM.

REPORTED BY E. D. PAYNE, M. D.,
SURGEON U. S. NAVY.

J. D. N——, æt. 17 years, was admitted to the Naval Hospital, District of Columbia, June 27, 1867. His hospital-ticket states: "Adynamia. Was admitted to the sick-list June 1, 1867, affected with otorrhœa of the right ear, which still continues, caused by exposure while out of the ship. His chief difficulty now is a debilitated condition of the system, produced by the same cause."

On admission, he presented the following condition: Body very much emaciated; countenance sometimes anxious and brows corrugated, but generally conveying the impression that he paid but slight attention to surrounding objects; pupils widely dilated; strabismus of the left eye; tongue heavily coated; bowels not moving oftener than once in two or three days, sometimes voluntarily, and other times involuntarily; urine passed naturally and in proper quantity; very imperfect use of his limbs; with the right hand makes very awkward motions, but has better use of the left; is disposed to sleep a good deal of the time, but when he awakens is very irritable and complains loudly of his head; pulse 90, small and weak; appetite poor. The discharge from the ear is, in quantity, from an ounce to an ounce and a half in the twenty-four hours. Complains of considerable pain in the back of the head, and often carries his hand there to support it.

His previous history is, that, up to within a short period of his last illness, he was a bright, active boy, and never complained of an unusual amount of pain in his head, nor was subject to otorrhœa. The first thing noticeable in his case was dissatisfaction with his condition on board ship—complaint of his meals and his sleeping arrangement. Then he thought he was being starved by an insufficient amount of good food and made sick by sleeping in a hammock. To free himself from this unsatisfactory condition he left the ship; but, after being out over night, when he probably slept on the ground, he was brought back, and almost immediately placed on the sick-list for cold and pains in the ear. Otorrhœa followed the earache, and he declined in health instead of improving. His case was now considered one of nostalgia. In this condition he was brought to Washington, where his family lived, with the hope that the change would prove beneficial.

The fact that his father had slight strabismus induced the belief, at first, that in this case it might be congenital; but this belief was dissipated by the denial of his friends and the progressive character of the affection.

Tonics, light, nutritious diet, beef-tea, and punch were given, under the use of which there appeared some improvement. The emaciation was checked, the strength increased, he gained better use of his limbs, recovered control over his evacuations, the countenance became brighter, and he was more cheerful during the day, and his sleep was more refreshing at night.

This induced the hope that he might, to a certain extent, regain his health, but only to a certain degree, for, as he gained in strength and spirits, an idiotic expression became fixed on his countenance. This seemed the more remarkable, from the fact that, though this idiotic expression was very apparent, his reasoning powers were good.

In this manner he progressed until the middle of August, at

which time he was able to sit up for an hour or two at a time, and to walk about the ward. Near the latter part of the month a change in the weather seemed to depress him and aggravate the symptoms. He again declined in strength, and all his symptoms were worse, except that he had control over the evacuations of his bowels.

For some days prior to his death there was an increase of suffering during the early part of the night, which would either end in a wakeful, uneasy night or in sleep resembling stupor. During the evening of the night on which he died he complained more than usual of his head, and his left eye was congested and the lid ecchymosed. About 10 o'clock he passed into a quiet sleep, from which he did not waken, but died about 3 a. m. on the 17th of September. So easy and quiet was this last sleep that the nurse in attendance noticed nothing unnatural in it, and only knew of his death by going to look at him.

Partial examination twenty-eight hours after death; only the brain examined.

Upon reflecting the scalp either way from the incision (carried from ear to ear over the top of the head) a quantity of extravasated blood was found between it and the aponeurosis of the occipito-frontalis muscle. The superficial vessels of the brain were highly engorged. On opening the membranes about four or five ounces of clear serum escaped.

The white substance of the brain was soft and pulpy; the base and ganglia disorganized; the cerebellum softened; medulla pulpy.

A fibrous sack, having connection with the petrous portion of the temporal bone of the right side, in the immediate vicinity of the internal meatus, was pressed back into the deep fossa behind the bone and bound down by the tentorium. It contained about one ounce and a half of pus. It was from this sack that the continuous discharge from the external meatus came.

The chief points of interest in this case are, first, a fibrous sack within the cranium, entirely distinct from, and not adherent to, the brain or its membranes, so distinct that after they were taken out it remained lying loosely on the petrous portion of the temporal bone. It was pear-shaped in appearance, had thick, firm walls, and contained about the same amount of pus that was discharged through the ear in the twenty-four hours, so that it must have filled and emptied itself that often. It is probable that it was developed from the fibrous covering of the bone; yet, what could have been the conditions which would produce this large sack, probably increased in size by distention, when the pus had a free exit from the ear?

It is probable that brain-softening began at the time when he first complained of his condition, and that his earache, cold, and remaining out of the ship were consequences of disease already in progress.

But what relations did the brain-softening and the sack have to one another? It is easy to believe that pressure by the sack might produce organic changes in the cerebellum; but, being firmly bound down by the tentorium, how was this to affect the cerebrum?

If the cerebellum is the co-ordinator of muscular motion, we have an explanation of the expressionless face and the awkward movement in the limbs, supposing the softening was confined to it. But there was still more of the cerebrum and ganglia, which raises the question as to how far their diseased condition affected the general movements of the patient.

The convolutions appeared to be healthy, which would appear to account for the preservation of the reasoning faculties at a time when the expression of the face was that of an idiot.

But is it not remarkable that such extensive disorganization should exist and life be prolonged for the space of nearly three months, after symptoms were developed which were not ex-

ceeded in gravity until two or three days before death, and that then death should occur, through suspended action of the medulla by pressure from effused fluid, so peacefully and quietly that no stupor or coma was noticed?

If the apparent teachings of this case are correct, that what appears to be a simple case of otorrhœa may in reality result in a sack, which shall, by distention, so press on the brain as to produce softening and death, each case becomes one of earnest solicitude; and, as otorrhœa often persists for years, then for years must there be an anxious waiting for the result.

A CASE OF ABSCESS OF THE LUNG, DISCHARGING BY THE MOUTH AND THROUGH AN EXTERNAL OPENING IN THE WALLS OF THE CHEST.—RECOVERY.

REPORTED BY E. D. PAYNE, M. D.,
SURGEON U. S. NAVY.

H. H——, second-class boy, æt. 16, native of England, admitted to the United States Naval Hospital, Chelsea, Mass., February 24, 1872, from the United States receiving-ship Ohio. Hospital-ticket states: "Pleurisy. Was taken sick in December, while on duty as a messenger-boy, and while on leave was taken with pleurisy, for which he was treated by some civilian. Was received on board the 18th instant in a debilitated condition. Since then he has not improved any. Whole of the left lung dull on percussion, and, save in the lower (posterior part) lobe, no auscultatory sounds. Chest enlarged on the affected side."

On admission, find a pale, delicate-looking boy in the condition above described. Effusion has taken place to such an extent that the naturally-depressed surfaces between the ribs have been obliterated. He is somewhat emaciated, has no fever, not much cough, but some expectoration of a white, glairy, tenacious character.

March 6.—Appears to be doing well, though there is not much diminution of the effusion.

March 9.—Not doing as well. Appears and feels weak. Raises a good deal of frothy mucus. Pulse rapid and weak. The mammary region of the left side, and extending as far as and partially over the sternum, shows a decided saucer-shaped

prominence, and the heart is felt to beat under the hand placed over the right side. Ordered beef-tea, milk-punch, and a large poultice to the left side of the chest.

March 15.—During the past few days he has been gradually growing weaker, and is now quite emaciated. Appetite keeps fair, and, though he cannot take beef-tea, he takes plentifully of punch and porter. Sputa very abundant, frothy, and intimately mixed with pus. The prominence of the chest, which is evidently due to a circumscribed abscess of the lung, is not quite as large.

March 21.—Does not appear much, if any, worse than at the last note. The enlargement of the chest is slightly reduced in size, emaciation very great, and sputa contains a good deal of pus. There is, apparently, an abscess, which connects with the lungs, pleura, and walls of the chest; as, by manipulation, the fluid can be felt and heard passing through the opening. Takes freely of nourishment, is quite cheerful, and sleeps pretty well.

March 28.—Enlargement remains; cough troublesome; sputa not as abundant, though still containing a good deal of pus; sleep and appetite good; pulse retains good force and volume; emaciation great.

April 2.—No material change since last note. Abscess remains well defined, and its pus is discharged by the mouth with the sputa. It does not appear to diminish in size. Strength keeps good.

April 6.—No change.

April 11.—Appears a little stronger during the past few days.

April 15.—Appears stronger than a week ago, but the prominence of the chest remains, and the expectoration still contains large quantities of pus. This morning there is a point, about one and a half inches below the nipple, between the fifth and sixth ribs, which is very tender to the touch, has a thin feeling under the finger, and is considerably heightened in color; indi-

cation of pointing. Fearing the consequences of a rupture of the walls of the chest under such circumstances, the spot was thickly covered with isinglass-plaster, more for the purpose of postponing the dreaded rupture than with the hope of permanent good.

April 26.—The abscess remained stationary for some days, and continued to discharge by the mouth; but, during the past two, it has become so prominent, and the integument over it so thin, that it was determined to open it rather than allow it to burst. It was thought that a valvular opening, having its mouth at the base of the abscess, would save a ragged opening, which must result if it burst, and might prevent the entrance of air. Accordingly, a hydrocele-trocar was entered at its base and directed upward to its center, when the instrument was withdrawn and the canula left in. About a drachm of pus first came out, and then about as much of thick, dark blood, after which nothing more appeared. The pleura was not thought to be punctured, and it was supposed that no air entered, as the canula was evidently choked with blood. No ether had been given, on account of the large amount of lung involved in the disease, but one-fourth of a grain of morphiæ sulph. had been given to quiet nervous apprehension and deaden pain. But this did not have the desired effect, and he manifested so much excitement that the canula had to be withdrawn without further results and closed by plasters, and an additional fourth of a grain of morphiæ sulph. given. During the day, prior to the attempt, his pulse had been 130, and respiration 42. It was not materially accelerated by the operation, but he remained for a long time quite excited, and did not sleep until midnight.

April 27.—Doing well; wound looks well; abscess about the same; pulse, 100; respiration, 24.

April 28.—Continues in the same condition, though more cheerful. Manifests decided unwillingness to have any further

interference with the parts. Some shriveling of the integument.

May 6.—Yesterday forenoon the abscess broke externally, through the opening made by the trocar, and discharged about one and a half ounces of pus, and the discharge has continued. He appears a good deal relieved by it, and his pulse, respiration, and appetite are better.

May 16.—Abscess continues to discharge very freely through a large opening. No inconvenience is experienced from it, but he is gaining in flesh, strength, appetite, and general spirits. Lung seems to be expanding, and percussion-resonance is much better, but large mucous râles are heard over nearly the whole of the affected side. The impulse of the heart is gradually returning toward the left side.

May 25.—Not as much discharge from the abscess. He sits up a little every day, is gaining strength, has no cough nor expectoration, sleeps without morphia, and appetite is good.

June 3.—Discharge from the abscess continues.

July 8.—Is able to walk about the grounds. Abscess continues to discharge. Has occasional paroxysms of cough and spitting up purulent matter.

July 20.—Gradual, though slow, improvement. Some better discharge appears through the external opening, and the discharge of muco-purulent matter by the mouth continues.

August 1.—No special change to mention.

August 28.—Has steadily gained in his general condition, and has increased some in weight and height. The opening through the walls of the chest is closed, but there is some discharge by the mouth. The left side is generally flattened, and there is a depression at the point where the opening was.

September 27.—Doing well. Gaining in size, weight, and strength.

October 10.—The affected side is rounding out to its natural proportions, percussion-resonance is improving, and he states

that he feels as well as he ever did. His appearance is that of a healthy boy of his age.

January 1, 1873.—Height, 5 feet 3½ inches, (a gain of 3 inches within a year;) weight, 103 pounds; chest-measure, 29½ inches, with expansion to 31 inches; strength, good; complexion, ruddy; percussion-resonance and respiratory murmur normal, even immediately surrounding the cicatrix. There is a little prominence of the sternum, giving him the appearance of being slightly pigeon-breasted. The left side is flatter than the right, and the cicatrix a little depressed. Impulse of the heart at its natural position.

Remarks.—The lessons evidently taught by this case are, first, that in similar cases it is proper to open the abscess, give free vent to the contents, and thereby relieve the respiration of its oppression and the general system from the effects of blood-poisoning by pus as rapidly as possible; second, that in an operation of that kind the surgeon should keep in view the object to be gained, and not be prevented in its completion by any circumstances which will not tend to hasten a fatal termination of the case. In this case it is doubtless probable that more satisfactory results would have been gained if the operation had been persisted in, the canula cleaned of its clot, or even if an opening had been made with a knife; third, that it is an error to suppose that when air enters the cavity of the chest it is necessarily a dangerous complication, for this boy was in the habit of amusing himself and others by pressing on the elastic walls of the chest, forcing out and hearing air enter.

It is, of course, impossible to say what the changes from a normal condition of the parts now are, but I believe the course and termination of the disease to have been as follows: First, pleuro-pneumonia; second, effusion into the pleural sack and formation of an abscess on the surface of the lung; third, enlargement and bulging of the abscess pushing the double wall

of the pleural sack before it, until ulceration agglutinated one wall of the sack to the other and both to the side of the chest, and finally pierced through the integument between the ribs. That the abscess was in the lung was demonstrated by the fact that he discharged pus by the mouth before doing so by the external opening; by the fact that it was moderately well defined in its extent; that it was in too prominent a part of the chest to have been in the pleural cavity and the result of pleuritis; and that the final discharge was from the mouth after the external wound had closed.

A CASE OF SIMULATED APHONIA.

(Detection by etherization.)

REPORTED BY E. D. PAYNE, M. D.,
SURGEON U. S. NAVY.

R. B——, cockswain, æt. 32, was admitted to the United States Naval Hospital, Chelsea, Mass., June 29, 1872. His hospital-ticket, dated March 29, 1872, states: "Chronic disorder of the stomach, appearing November, 1870, and November, 1871. It appears to have been excited or influenced originally at Havre, November, 1870, by cold, and cold induced it this winter."

At the time he was admitted he appeared in robust health, with the single exception that he spoke in hoarse, rasping whispers. He stated that he was subject to attacks of disordered stomach, manifested chiefly by spells of vomiting, which occurred at night, and that he had been unable to speak in a loud tone of voice since the previous March. He was strongly built, and his muscles had good firmness and tenacity. It seemed remarkable that a man should be, apparently, in such good health, so well nourished, having such a ruddy complexion, and so much muscular tenacity, who was suffering with chronic disorder of the stomach. It also appeared strange that he should have been unable to speak loud for months without any indications of sore throat or be laboring under any nervous affection. My suspicions were aroused by these contradictory evidences; but, as he had been especially recommended to my kindest care as a case deserving of sympathy, I determined to have him carefully watched before deciding

upon any course to pursue. The result of which was that he was found to eat, drink, sleep, and perform all the natural functions of the body the same as a well man, with the single exception of never being heard to speak in a loud tone of voice, and he was only found to have his spells of vomiting after having been on liberty and drinking.

On July 22, a sufficient length of time having elapsed for him to manifest some evidences of illness aside from loss of voice, and no cause being discovered which could account for that, he was put partially under the influence of ether, which was given until the stage of excitability came on. As soon as that was reached he began to sing and talk as any ordinary person would under the same circumstances. The ether was then withheld, and he was allowed to regain consciousness while still singing and talking, that he might comprehend how completely he had demonstrated his fraud. After the confusion produced by this demonstration had passed away he was given a gentle admonition of what the consequences would be if he continued his malingering, which resulted in the confession that it had been instituted and kept up for the purpose of being sent home and getting his discharge.

HYPODERMIC INJECTIONS OF ATROPIÆ SULPHAS IN EPILEPSY AND EPILEPTOID CONVULSIONS.

REPORTED BY R. J. PERRY, M. D.,
ACTING ASSISTANT SURGEON U. S. NAVY.

Of all diseases affecting the nervous system, there are none so little amenable to treatment, or in which more unsatisfactory results have been obtained by the exhibition of remedies, as epilepsy. In this disease, as in most others, if the cause can be rationally and satisfactorily arrived at, we can hope, in some degree, for a cessation of the trouble by a removal of the cause, provided it be not organic. If the paroxysms depend upon some local irritation, producing functional derangement of the stomach, bowels, or other organ, and involving, by reflex action, the nerve-centers, our first attention is to be directed to the exciting cause and its removal. Unfortunately, the remote and intermediate previous history of probably the majority of cases of epilepsy is difficult to obtain, and we are forced to determine our course of treatment by the concomitant signs and symptoms manifested after the patient comes under our professional care. As each succeeding paroxysm generally increases the irritability and debility of the nervous system, after our endeavors to remove, if possible, the cause, the next desirable end is to prevent, if we can, the frequency, duration, and intensity of the paroxysms.

I now propose a brief report of a case, in which hypodermic injections of atropiæ sulphas seem to have exerted a very de-

cided beneficial effect, to which I would respectfully call the attention of the profession generally, and particularly the medical officers of the Navy, since it is rare that a Government vessel makes a cruise, however short, but that one or more cases of epilepsy require treatment.

Case.—W. W——, a native and citizen of Key West, Fla., aged 47 years, some ten or twelve years since was attacked with mild epileptoid convulsions, which gradually increased in frequency, duration, and intensity up to about three years ago, since which time he has had almost daily recurrences of well-marked paroxysms of epilepsy, attended with the usual manifestations of the disease in general, preceded by brief premonitions, as vertigo, giddiness, and aura epileptica. In the treatment of this case, up to December, 1872, the usual remedies had been resorted to. Preparations of zinc, nitrate of silver, bromide of potassium, belladonna, and the mineral and vegetable tonics were used with little or no benefit. The first exhibition of hypodermic injections of atropia I made in this case was on the evening of December 1, 1872, about 8 o'clock, after the patient had experienced two convulsions, the fortieth of a grain (only one dose) injected into the arm just above the elbow. One convulsion followed at the time, but much lessened in duration and intensity, when the paroxysms ceased. Before this they always occurred at intervals of twenty or thirty minutes during the greater part of the night, not unfrequently extending into the next morning; the paroxysms varying in number from twenty to forty during a single night. I then placed the patient upon half-drachm doses of potassium bromide, in conjunction with one drachm of tinct. cinchonæ comp., three times a day. No other paroxysm occurred until about the same hour of the evening on January 12 of the present year, when another injection of atropiæ sulph. was resorted to as before, followed by the same results, the patient passing off immediately into a quiet,

natural sleep of some eight hours' duration. I then instructed the patient and friends, upon the slightest symptom of an approaching return of the convulsions, to advise me at once, which was done on the evening of February 20, and, reaching the patient previous to any paroxysm, I administered the injection as before, when the symptoms disappeared. No paroxysm followed, nor has there been any appearance of the trouble since, now near four months. I would state that the previous history of this case, as involves cause and effect, is very obscure, and that I was induced to use belladonna in the form of hypodermic injections of atropiæ sulphas, for three very good reasons: First, I could be more certain of its immediate effect; second, the greater certainty of its quality; third, of the quantity administered. In the case reported above larger doses of the atropia were used than, I think, ordinarily advisable, in consequence of the amount of belladonna previously given. In ordinary cases of epilepsy or epileptoid convulsions we might expect the beneficial effects of atropia, I think, injected in doses of the fiftieth, sixtieth, or eightieth of a grain, as indicated by circumstances, with no apprehension of any unpleasant results. I would incidentally add, that epileptoid convulsions, resulting from the excessive use of alcoholic stimulants, in a case which came under my observation in consultation with Dr. Porter, of the Army, some two months since, were at once subdued by the administration, at my suggestion, of the sixtieth of a grain of atropiæ sulphas injected into the arm.

KEY WEST, FLA.,

June 10, 1873.

EPILEPSY TREATED BY HYPODERMIC INJECTIONS OF SULPHATE OF ATROPIA.

REPORTED BY C. U. GRAVATT, M. D.,
ASSISTANT SURGEON U. S. NAVY.

Charles Davis, landsman, aged 21, native of New York, had his first epileptic seizure when about 6 years of age. The disease followed its ordinary course for several years, after which it gradually subsided, so that at the age of 12 he thought that he had "outgrown" it, not having had a paroxysm for a long time, and no other appeared until two years later, when he was accidentally struck on the back of his head (right side) by a stone thrown by a playmate, and which produced immediate unconsciousness. From that time the convulsions recommenced, returning at irregular periods until he was 18; after which he again considered himself well. A cicatrix, about one and a quarter inches in length, now marks the spot where he was struck, but there is no observable depression. All of his attacks are described as having been very severe, and in a letter from his father, which has been handed me, and who is himself a physician, it is stated that his "son has the worst case of the disease he ever saw." Patient enlisted in the Navy on the 28th of August, 1872, and was attached to the United States flag-ship Worcester, which arrived at Key West, Fla., in the fall of 1872. Davis then experienced his first exposure to a tropical sun. In February last, (1873,) without any known cause, the disease reappeared. At varying intervals the paroxysms recurred, becom-

ing more and more frequent and severe, each one continuing for a long time, the patient passing in rapid succession from one convulsion into another, and by them his general health was much reduced. It was finally decided to send him north, and for this purpose he was transferred to the Powhatan. That ship being unexpectedly detained, however, he was then sent to the hospital-ship Pawnee, where he was under my care.

He is a man of considerable intelligence, and gives quite a lucid description of his condition. From his statements and those of some of his former shipmates it seems that, while on the Powhatan, (nearly a month,) the paroxysms occurred daily and usually observed a good deal of regularity in appearing between 7 and 8 p. m., frequently lasting for several hours, or even through the entire night. As a rule, certain premonitory symptoms precede his attacks, commencing with tingling of legs, (particularly of left.) This gradually ascends, involves the surface of the body, and terminates in intense pain at crown of head, at a point about two inches distant from the cicatrix alluded to, loss of consciousness, and convulsions, the latter attended by opisthotonic contortions, convulsive masticatory movements, frothing, coldness of lower extremities, without increased heat of head, small, weak, compressible pulse, and slight dilatation of the pupils. The first one in which I saw him occurred on the evening of his admission, April 1, between 7 and 8 o'clock; it continued for three-quarters of an hour. Upon recovering he complained of a painful sensation in right side of the chest, compared to a "feeling of water running down." Potassii bromid., grs. xv, and ext. valerianæ fl. ℥ss, ter die, were prescribed. I would here state that his former treatment has consisted of sodii brom., potass. brom., zinci carb., and a laxative preparation, with ext. of nux vomica.

At 6 p. m., of the 2d, another paroxysm ensued, and continued for nearly two hours, during which any sudden noise, as the

striking of the ship's bell, sound of the boatswain's mate's pipe, &c., would be sufficient to cause renewed convulsions; and on each occasion of progressing recovery the peculiar sensation in the chest would be alluded to, and much care was required to prevent him from tearing himself in that region, and from pulling the hair from the top of his head. Intense photophobia followed this attack, requiring his cot to be thoroughly shaded from the light. This gradually disappeared, however, after a few days. Two dry-cups were applied to the chest over the seat of pain, but very little relief was afforded by them.

At 9 p. m. of the same day another paroxysm occurred. The first injection of atrop. sulph. was then given—dose, fortieth of a grain, as used by Dr. Perry—and a marked contrast was produced in the severity of the convulsions. Whereas before there were violent contortions of a tetanic character, lowering of pulse, &c., on this occasion there were but slight muscular twitchings, pulse remained natural, and there was no coldness of lower extremities, and *no frothing* throughout the paroxysm, which continued a little over half an hour; but, consciousness being re-instated, quite alarming toxic effects of the remedy were discovered, consisting of excessive thirst and dryness of mouth, throat, and fauces, producing complete aphonia and difficult deglutition, and countenance also indicated very great distress and anxiety. Fifteen drops of opii tr. were given, and in less than a quarter of an hour he was sleeping quietly, and the salivary action was restored, as shown by the introduction of the finger into the mouth. The potass. brom. and valerian were then suspended, so that the effects of the atrop. sulph. could be more satisfactorily tested. In consideration of the regularity with which the paroxysms had been recently occurring, one-fiftieth of a grain was injected on the evening of the 3d, at 6 p. m., and the paroxysm was delayed until between 12 m. and 1 p. m. of the following day. An injection of the same

enough as the last was immediately given, with the effect of rendering the convulsion very mild, and it was succeeded by another. These diminished these gradually but slight thirst and dryness of the mouth. One-fiftieth of a grain was injected at 6 p.m. On the 7th, 8th, and morning of the 7th he appeared so much improved that no injection was given, being unwilling to keep him constantly under the influence of the remedy. The following notes were made after the evening visit of the 7th:—Found him in a cot, with involuntary twitching of legs, the tingling sensation extending from them up the body and down the left arm, the right arm remaining free, and considerable mental anxiety. Gave injection of one-fiftieth of a grain of atrop. sulph., and in a few minutes he became perfectly quiet. The pains and tingling ceased, and no dryness of mouth followed the administration. At 9 p. m. was sleeping quietly." At 2 a. m. of the 8th the above symptoms returned, and were again promptly controlled by one-fiftieth of a grain. The next premonitions were felt on the 17th. On this occasion I was unable to administer the injection before the accession of the convulsions, and when given its usual effects were not obtained. This, however, I have no doubt, may be attributed to the probability that the solution was pressed out of the arm during the efforts of the attendants to hold the patient. On the 23d another paroxysm controlled. Between this last date and May 10, when he was again transferred to the Powhatan, the attacks were more frequent, but were epileptoid in character, never epileptic; and I have every reason to believe that they were induced by the high temperature to which he was constantly exposed, caused by the ship's galley and condenser, the latter, during that time, being kept in continual operation, producing an average heat of 90° on the deck occupied by the sick. These latter convulsions produced no increased debility. On the contrary, the patient's strength, weight, and general appearance seemed to

improve, so that when discharged he was active and apparently quite well between the paroxysms.

While the recent history of the foregoing case does not bear out my more sanguine hopes entertained during the long intermission between the 8th and 17th of April, during which the patient improved rapidly, still I feel justified in believing that had his subsequent surrounding circumstances been more favorable he would, in all probability, have escaped any return of the convulsions, and have been discharged with every hope of ultimate relief; and, as all the improvement gained may clearly be attributed to the atrop. sulph., nothing else being used, I am inclined to think it will prove a potent and valuable remedy for epilepsy, and will be glad of another opportunity of testing it.

A CASE OF PARAPLEGIA.

REPORTED BY J. JOHN PAGE, M. D.,
ACTING ASSISTANT SURGEON U. S. NAVY.

John Kenney, seaman, a native of Ireland, aged 24 years, single, being compelled, in the execution of his duties, in the month of March, 1872, to stand in the water for a considerable time every day for several consecutive days, "caught a severe cold."

On the morning of the fourth day after the cessation of duties thus imposed he had a feeling of numbness and heaviness in the great toe of the right foot; a sensation characterized by every one as being "asleep," without the uncomfortable prickling usually accompanying that condition. In about an hour this numbness was succeeded by a sensation likened by him to a ball of ice the size of a pea rolling beneath the skin of the toe and slowly approaching the ankle. Reaching the ankle this "ball" appeared to diffuse itself over the leg, and in thirty-six hours a numbness pervaded the entire limb. The power of motion still remained, while sensibility was lost. In about twelve hours, as nearly as he can recollect, the sensations already experienced in the right leg were felt extending down the left leg, and in a few hours it also was completely enveloped in the indefinable feeling of weight and distention. During all this time there was a total absence of pain. Sensibility now suddenly returned, and all voluntary movements of the muscles of the limbs ceased.

Paralysis of the sphincters ensued in about two days, and his urine and fæces were passed without his knowledge. His appe

tite soon failed, his temper became fretful, considerable sloughing of the tissue over the sacrum occurred, and emaciation was rapid.

In this condition he continued from the first of March to the last of July, 1872, undergoing various methods of treatment, viz, by cupping, ice-bags along the spine, by strychnia and electricity. Improvement commenced about the 1st of August, and he recovered the use of his limbs so as to be able to hobble about the floor by the aid of chairs.

He remained in this condition until January, 1873, when a relapse, unprovoked, occurred. In this relapse there were none of the symptoms experienced at the primary attack, but a feeling of utter prostration prevailed for three days, and left him again unable to move his limbs.

When brought into the United States Naval Hospital, Washington, D. C., April 15, 1874, he presented the following features, viz: Anemic; lips bloodless; muscles soft and atrophied; eyes sunken; inability to walk a step; surface cold and clammy; feet cold; tongue covered with a white fur, through which red papillæ could be seen; a fetid breath; involuntary evacuations from both rectum and bladder; pulse 88, and wiry; temperature, 99°; respirations 20, and natural, and some posterior curvature of the spine, the spinous process of the seventh dorsal vertebra being quite prominent, but not painful on pressure. There has never been any pain in the back or limbs, unless a sense of fullness and formication can be called pain. The urine, on standing, soon became alkaline and turbid, exhaling a very offensive ammoniacal odor. The muscular walls of the bladder were not paralyzed, as the urine was occasionally thrown out with considerable force. His mind throughout had retained its full vigor.

It is not proper, in a paper of this sort, to discuss the etiology of a disease of which paraplegia is a result.

The treatment, after admission to the hospital, consisted of one-thirty-third of a grain of strychniæ sulphas in one fluid-drachm of dilute phosphoric acid at night, with a concentrated nutritious diet. At the same time I used a faradic current from a two-cell battery. One sponge, attached to the negative pole, was held against the soles of his feet, and the other, attached to the positive pole, was moved along the spine for five minutes every morning.

Improvement was apparent at the end of one week, when the strychnia was increased to one-thirty-third of a grain morning and evening. Slowly and surely the sphincters have regained their tonicity, controlling their outlets; the eyes resumed their luster; the atrophied muscles became full and hard; the appetite excellent; the urine normal; and he was permitted to extend his walks gradually until, at the present time, June 22, 1874, he is able to walk a mile without fatigue, and there is a prospect of entire and permanent recovery.

A CASE OF CARCINOMA OF THE STOMACH.

REPORTED BY S. A. BROWN, M. D.,
ASSISTANT SURGEON U. S. NAVY.

John Hilton, naval beneficiary, aged 72 years, a sailor by occupation, of intemperate habits, was admitted to the Naval Asylum, on the 8th of February, 1875.

On admission he presents the appearance of extreme emaciation and feebleness. Exhibits tenderness of the epigastrium, particularly marked over cardiac end of the stomach. Has had irritable stomach for a number of months, and for three weeks has been unable to keep down a single meal, the ingesta being rejected in from a few minutes to an hour after being swallowed. Is very pale, and complains of a hollow, hungry feeling in the stomach. Pulse very weak, and 100 per minute. The radial and ulnar arteries tubulated, probably calcareous. The tenderness on pressure in epigastrium was promptly relieved by the application of a mustard-plaster. From the 10th to the 25th fed with pounded raw beef, milk and lime-water, raw oysters and oyster-juice, successively, each of which he at first seemed able to retain, but afterward rejected; no portion seeming to pass into the intestines.

February 25.—The vomited matters assume a very markedly grumous "coffee-ground" appearance. Complains of no pain or tenderness on pressure in any part of the abdomen. Ordered enemata of beef-essence, two ounces every three hours, which, on the 26th, was increased to the same quantity every two hours during the day. He was also allowed a soft-boiled egg by the mouth.

February 28.—Was affected with hiccough, which would not yield to ice or creosote mixture. Enjoyed eggs very much, but ended in vomiting them.

March 2.—Is unable to leave his bed; complains of diffuse soreness throughout abdomen, but pain on pressure cannot be elicited at any particular point. Owing to the character of the vomit, the apparent imperforate condition of the pylorus, and the man's general cachectic appearance, the morbid condition of the stomach is believed to be cancerous, notwithstanding the absence of pain and tenderness.

March 3.—Is allowed a small quantity of ale. The ale he greatly enjoyed, but eventually rejected. It was afterward exchanged for porter, of which he took, sometimes, as much as twenty-four ounces in the twenty-four hours; it being the only thing which he could retain for even a short while.

From this time until the fatal termination of the disease, on March 11, 1875, the only treatment consisted of nourishing enemata, such as beef-essence and yolk of eggs, and of porter and a little egg-nogg by the mouth.

On *post-mortem* examination, made eleven hours after death, there was complete *rigor mortis*. Cadaver was excessively thin; the anterior wall of the abdomen, falling against the spine, molded its complete outline. The fat of the adipose structures entirely absorbed, the cavities of the body containing no fluid, and the tissues generally exceedingly deficient in moisture.

The stomach was found to be reduced to, at most, one-third of its normal size and capacity. The lesser curvature and pyloric end of the organ were the seat of a large ulcerated scirrhous tumor, four inches in length, from two to two and a half inches in breadth, and one-half to three-quarters of an inch in thickness, which quite occluded the pyloric orifice, and, preventing the passage downward of ingested material, caused it to be rejected by the mouth. The mucous membrane was much

thickened, and of very dark color, that portion lying over the tumor being irregularly and very deeply ulcerated. Numerous adhesions existed between the stomach and the liver, colon, duodenum, diaphragm, and parietes of the abdomen, firmly binding it down in place. The liver, spleen, pancreas, and kidneys were all somewhat atrophied, but otherwise unaltered. So, also, of the small intestines; but the colon presented a very peculiar appearance. Quite normal in the first half of its extent, about the middle of its transverse portion it suddenly becomes greatly reduced in size; the longitudinal muscular bands approximate each other, the sacculated condition altogether disappears, and the intestine assumes a diameter not greater than that of the little finger, which small size continues throughout the descending portion; the sigmoid flexure and upper part of the rectum becoming most narrowly constricted about four inches from the anus, and then suddenly terminating, the intestine expands to its normal caliber.

This case is interesting, on account of its deficiency in pain, tenderness on pressure, and circumscribed tumefaction in the affected part, and particularly so when the extent of the disease is remarked.

[In forwarding the above report, Medical Inspector Shippen, United States Navy, makes the following indorsement thereon.—H. C. N.]

"Forwarded, with the remark that the almost entire absence of localized pain, as well as the rapid course of the disease, distinguish this from the common run of cases of scirrhus of the stomach. Pain was at no time a prominent symptom, and, for a short time, it was thought that the case would prove one of gastric ulcer."

U. S. NAVAL HOSPITAL,

Philadelphia, March 17, 1875.

SUMMARY REPORT ON THE NATURAL HISTORY OF KERGUELEN ISLAND.*

By J. H. KIDDER, M. D.,
PASSED ASSISTANT SURGEON U. S. NAVY.

NAVY-YARD, NEW YORK, *June* 12, 1875.

SIR: Inclosed herewith I have the honor to forward a summary report upon the natural history of Kerguelen Island, as observed by me, omitting all technical details, excepting specific names, where these are known.

I have nearly finished rewriting the measurements, descriptions, and field-notes collected concerning the birds of the island, which Dr. E. Coues, United States Army, has kindly undertaken to edit for me. It has been proposed to me to publish this treatise as one of the Bulletins of the National Museum, and, as it is likely to be of interest only to ornithologists, I respectfully request your permission to do so.

Very respectfully,

J. H. KIDDER,
Passed Assistant Surgeon, U. S. Navy.

Surg.-Gen. J. BEALE,
U. S. Navy.

REPORT.

The natural-history specimens collected on Kerguelen Island, in connection with the Transit of Venus expedition, having arrived at New York, per sailing-bark from Cape Town, on May 21, have been forwarded to the Smithsonian Institution, and

* A detailed report of the natural history of the expedition to Kerguelen Island will soon be published under the authority of the Smithsonian Institution.

found to have sustained no material damage by the voyage. I am, therefore, now in a position to report briefly the general scientific results of the expedition, with reference to the duty to which I was detailed.

The spot selected by Commander Ryan for an observing-station was at the head of Royal Sound, (near the southern end of the island,) on a plateau or terrace 130 feet above the level of the sea, and on the easterly side of a considerable bluff overlooking the bay. The southern portion of the island, so far as we were able to penetrate, is formed entirely of volcanic rock, showing no trace of stratification, and of very little geological interest. Stratified rock and a considerable coal deposit have been found in the northern part of the island, with the silicified trunks of large trees. Captain Fuller, of the sealing-schooner Roswell King, informs me that a very large glacier occupies the central part of the island, extending in a general easterly and westerly direction. The central part is in general mountainous and covered with snow, reaching an altitude, on Mount Ross, of about 5,000 feet. The island is treeless, barren, and covered with a scanty vegetation, whereof cryptogamous plants form by far the greatest proportion. It is situated in a region of almost constant precipitation, and exposed to frequent and extraordinarily violent gales of wind, the effects of which are to be seen in the often fantastic forms of the rocks which crop out at the tops of most of the hills.

Of phænogamous plants, I found only twenty-one species, including, with one exception, (*Limosella aquatica*,) all of those attributed by Dr. J. D. Hooker to this locality, and, perhaps, adding three species of *Ranunculus* and a grass to the list, besides three ferns. The remaining cryptogams have not yet been identified, but the botanical collection has been placed in

* Two new species of moss have been found in the collection, and described by Mr. T. F. James, of Cambridge, as *Grimmia falcata* and *G. kerguelensis*. Also, one new genus and three new species of lichens, determined by Prof. Edw. Tuckerman.

the hands of Professor Gray,* at Cambridge, for final judgment. Of especial interest among the plants are the now well-known Kerguelen cabbage, (*Pringlea antiscorbutica;*) the Kerguelen tea, (*Acæna affinis*, Hook. fil.,) a rosaceous plant much used by whalers as a febrifuge and diaphoretic; *Leptinella plumosa*, one of the *Compositæ*, used as an emetic, (in decoction); and *Lyallia kerguelensis*, Hook. fil. The last-named plant is quite unique, being strictly *sui generis*, and the only species of its genus yet discovered. The more fragile flowers have been brought home preserved in glycerine, as well as in sheets.

Of terrestrial mammals, but a single species, a mouse, was found to inhabit the island, and this is doubtless a descendant of individuals imported many years ago by sealers, when this island was the great breeding-place of the sea-elephant. It is to be found everywhere on the island, burrowing mostly in sandy hill-sides, and feeding on the seeds of grass and the roots of *Azorella*. One nest was found in the skull of a sea elephant. The domestic cat has also run wild upon one of the islands which limit Three Island Harbor, in Royal Sound, and is said to have developed great ferocity and some change of appearance. I had no opportunity to visit this island, nor did I succeed in securing any specimens.

Of seals, the most familiar examples were the sea-elephant, (*Macrorhinus proboscidea*,) and the sea-leopard, (*Stenorhynchus leopardinus.*) But a single individual of the former "hauled up" near our station, the skin of which has been preserved. The latter was seen twice, but escaped capture both times. The speed in the water of the sea-leopard is described by whalers as being most extraordinary, exceeding even that of the king-penguin, which forms a large part of its food. Another skin and complete skeleton of the sea-elephant were obtained by purchase from Heard's Island, the animals having been driven almost entirely away from the more accessible parts of the island by the wastefulness with which they have been slaughtered in former

years. But a single small schooner was engaged in hunting them during our stay, two others and a bark "working" Heard's Island, some three hundred miles to the southward. Those which are still captured on Kerguelen Island are only the stragglers from Bonfire Beach, a portion of the west coast quite inaccessible from the sea, where great numbers still repair annually to breed. Fur-seals are occasionally captured upon the small islands near the coast, and at least two species of hair-seal; but none came under my observation.

Specimens of twenty-one species of birds were brought home, all inhabiting and breeding upon the island. Of fourteen of these the eggs were obtained, of ten the young, and of seven both eggs and young, besides a number of anatomical preparations. Many of these specimens are of great scientific interest, especially in view of the fact that our long stay on the island during the breeding-season afforded an excellent opportunity for observing their habits, hitherto, in many cases, but very imperfectly known. But a single one of these, the unique "sheath-bill," (*Chionis minor*, Hartlaub,) is a land bird, pure white, and bearing a strong superficial resemblance to a domestic pigeon. It is rare in museums, and occupies rather a doubtful position, having been classed by Cuvier with the *Grallatores*, and by Buonaparte with *Rasores*. It feeds on sea-weeds and small crustaceans on the rocks near high-water mark, nests in crevices among fallen rocks, laying three very large, brown-streaked eggs, and is easily domesticated, being almost without fear of man. The remaining twenty species all belong to the *Natatores*, and include one teal,* green-winged, and probably a species peculiar to the island, since it does not migrate. This teal is largely a vegetable feeder, and an excellent bird for the table. It was the main dependence of our party in the way of fresh provisions.

* Since described by Mr. Sharpe as *Querquedula eatoni*, in compliment to Rev. A. E. Eaton, naturalist to the English party on Kerguelen Island.

Besides the teal, there is a single species of cormorant, (*Graculus carunculatus*,) beautifully marked by an erectile crest of thirteen small plumes, bright-yellow caruncles, and a broad circle of cobalt-blue surrounding the eye. The back and neck are of a brilliant changeable green, with violet tints, and the breast, throat, and under parts of wings pure white. These gay markings are confined to the female during the breeding-season, the male bearing a much more sober plumage. There is one species of gull (*Larus dominicanus*) distinguished by black wings fringed by a broad band of white, black back, and white head and tail. Specimens have been preserved, showing many intermediate changes in the plumage of the younger birds, after different moults, which might easily give rise to the supposition that there are several different species. A beautiful pearl-gray tern, with coral-red feet and bill, very like the arctic tern, (*Sterna macroura*,) proves to be *Sterna vittata*, Gray. A very large dark-colored skua, marked by a white bar under the wings, (*Buphagus skua antarcticus*, [Lesson,] Coues,) the homologue of the great northern *Lestris catarractes*, occupies the place and function of a bird of prey, being almost exclusively terrestrial in habit, although web-footed; living upon other birds which it kills for itself, and having in general the habits and appearance of a buzzard-hawk. The teal builds its nest in the long grass upon uplands, the cormorant upon the seaward faces of precipitous cliffs, and the gull, tern, and skua lay upon low land, in the open ground, only the gull building a nest.

Both the great white albatross (*Diomedea exulans*) and the sooty albatross (*Phœbetria fuliginosa*, Reichenbach) nest upon the island. The former build up their nests to the height of two or three feet, choosing low, marshy land, and lay one large white egg. The young birds ("gonies" of whalers) are said to remain by the nests for an entire year, and their first plumage is quite black. I counted twenty-three nests in view at one time,

near Prince of Wales Foreland, on the eastern side of Royal Sound. The sooty albatross builds upon some high shelf on the side of a cliff, making a much less artistic nest than the white albatross, and laying also but a single egg.

Ten species of petrel were found. Of these the giant petrel, the "Nelly" of whalers, (*Ossifraga gigantea*,) "quebrante-huesos" of the Spaniards, is the most remarkable for size, being quite as large as a goose. It is a carrion feeder, makes very long excursions in search of food, like the albatross, and has even been said (Darwin's Voyage of the Beagle) to kill other birds when hard pressed. Unlike other petrels, this bird lays its single egg upon the ground, selecting a dry spot where vegetation is scanty, but building no nest or burrow. The young, when half-fledged, is quite as large and heavy as its parent. At the other extreme, in point of size, is the graceful little *Procellaria nereis*, (Gould,) Coues, the smallest of petrels, smoky above, with a white breast. It nests beneath the margins of clumps of grass or Kerguelen tea, laying a single egg. I am told that there is no specimen of this bird in any American museum. Very similar, but much more familiar to naturalists, is Wilson's petrel, (*Oceanites oceanica*, [Banks,] Coues,) marked by a white band across the rump, with longer legs, and generally rather larger. Nests high on the hill-sides, among rocks. Thousands of a little diving petrel (*Pelecanoides urinatrix*) and two members of the family *Prionidæ*, or "blue petrels," (*Halobæna cerulea* and *Pseudoprion desolatus*,) nested in burrows close to our huts, flying about the hill-side in immense numbers as soon as night fell, and keeping up an incessant calling. The call of the former is a single plaintive note, with a rising inflection of sound; that of the latter strongly resembles the cooing of a dove. A visitor who should land on the island only during the day, returning to his ship every night, might spend a long time in the bay without even suspecting the existence of these birds, although

so numerous, since they are exclusively nocturnal in their habits. The great black petrel (*Majaqueus equinoctialis*, Reichenbach) also nests in burrows, laying a single large white egg, but is much less common than those just mentioned. Two species of *Oestrelata* were found, although rare. One proves to be *O. lessoni;* the other has not yet been identified,* and may prove to be a new species. All of these petrels, with the exceptions noted, burrow beneath great clumps of an umbelliferous plant, (*Azorella selago*, Hook. fil.,) which almost completely covers the lower lands of the island. It grows in mounds, often two or three feet high, the plants being so closely crowded together as to present a smooth and even surface, and, yielding readily to the foot, adds much to the fatigue of traveling any considerable distance.

I believe that the Cape pigeon (*Daption capensis*) and the yellow-billed albatross (*Diomedea chlororhynchus*) both also nest on the island, but not in the neighborhood of our station, both having been seen at sea near by. In addition to the petrels already mentioned, I found large numbers of young birds, called by the whalers "mutton-birds," which have not yet been absolutely identified.†

Three species of penguin close the list of birds captured, viz: the "johnnies," (*Pygoscelis tæniata*, [Peale,] Coues,) "rock-hoppers," (*Eudyptes chrysolopha*, Brandt,) and a variety of the king-penguin, (*Aptenodytes longirostris*, Coues,) differing from that of the Falkland Islands (*A. patachonica*) in some of the more minute markings. Both the "johnnies" and "rock-hoppers" nest upon the island, the former laying on a level plateau some 300 feet above the sea, and fully half a mile from the shore. Very distinct and deeply-cut roads lead to these rookeries, along which companies of twenty-five or thirty penguins may at almost any time be seen climbing their way. There are two broods when

* Since described as *Oestrelata kidderi*, Coues.

† They proved to be young of *Oestrelata lessoni*.

the birds are undisturbed, about two months apart, so that a well-grown young penguin may be found, late in the season, in the same nest with one just pipping the shell. The "rock-hoppers" nest in crevices where large masses of rock have fallen from the overhanging cliffs, and lay two eggs, both male and female remaining, as a rule, by the nest. The crests of another species of *Eudyptes* (*E. diadematata*) were brought in from Heard's Island, but I did not succeed in obtaining an entire skin. The king-penguins did not breed upon our part of the island, but occasionally visited it. Both they and the "johnnies" progress by *walking*, *i. e.*, by placing one foot before the other, whereas the rock-hoppers *hop* like sparrows, with both feet at a time, climbing the steep faces of rocks with wonderful agility.

No reptiles or amphibians were found upon the island, nor did I hear of any having been seen at any time.

Fish were not plentiful, since we never succeeded in catching them with lines from the shore. A specimen with an enormous head, like an exaggerated sculpin, captured from the ship, proves to be *Chœnichthys rhinoceratus ;* and several specimens which I captured by hand, in the little pools left on the shingle by the tide, represent only two species: *Notothenia purpuriceps* and *Harpagifer bispinis.* Doubtless several would have been added to this list had we been supplied with a practicable boat. As it was, we were quite confined to the shore and to the neighborhood of the station. A few specimens of small fish, taken in mud from the bottom, have not yet been examined.

A single *Octopus* was found upon the rocks, dead, by Mr. Stanley, who kindly gave it to me. Beaks of cephalopods were, however, among the commonest things found in the stomachs of the birds examined. Without the opportunity for dredging, it was scarcely possible to collect many specimens in

this class. Land-snails were abundant, although of small size, and often found gathered together in great numbers under stones. A few small shells, resembling *Turbinidæ*, were found from time to time in pools left by the tide or adhering to the rocks, besides several varieties of *Patella* and a small *Chiton*. A species of *Aplysia* was quite common, and at least two of *Mytilus*, (both edible,) with very fragile shells of a sort of *Pholas*. On one of the islands near by are specimens of a "petrified clam," quite similar to the familiar hard-clam of our coast. Singularly enough, no such clam is now to be found at Kerguelen. Among *Molluscoida*, ascidians and an immense variety of *Polyzoa* were found, almost every floating sea-weed being covered with their minute coral-like branches.

The representatives of the class *Insecta* were very interesting, including several forms peculiar to the locality. Several species of *Curculio* are found upon the rocks near the sea, and also at considerable altitudes. This family includes all the beetles that I saw excepting two small Carabids. The elytra of all but one seemed to be soldered together. Among the matted roots of the smaller plants were often found *Podurœ*, of at least two species, one being remarkably large. No other *Lepidoptera* were seen by me, although small Tineid moths were found by Mr. Eaton,* the English naturalist. The only flying insect that I found was a very minute gnat, which appeared late in November near the flowers of the Kerguelen tea. The cabbage is infested by a large species of apterous *Dipteron*, brown, with long legs, and without even a rudiment of the halteres or balancers. As one approaches a plant of the cabbage these insects may be seen dropping off by scores, counterfeiting death. Another species, smaller, darker, and with rudimentary halteres but no wings, was often found feeding on dead animal matter. Several were caught in a jar sunk to the level of the ground, which I had set as a bee-

* Since described by him as *Embryonopsis halticella*.

tle-trap. Still another yet smaller species inhabits the rocks by the sea-shore, and these show little triangular rudiments of wings, which seem to help them in jumping, (which they do with great agility,) but are by no means sufficient for flight. I believe that more careful examination will separate this last species into two. The *Hemiptera*, *Neuroptera*, *Orthoptera*, and *Hymenoptera* are not represented at all, as far as I know. Long streaks or bands of minute yellow dots, often seen on the rocks where the cormorants congregate, prove, on microscopic examination, to be very hard-shelled *Acarini*, in shape much like "lady-birds," (*Coccinella.*) Another species of *Acarinus*, bright red, and still smaller, is found in the axils of the leaves of the cabbage. Hunting-spiders are common in gravelly places and among stones, under which their tent-like egg-cases can almost always be found.

Among littoral crustaceans are several species of crab, innumerable shrimps, and at least two species of "pill-ball" isopods, one of which is over an inch long and of very handsome coloring. Small marine leeches are also very common, as are *Nereid* and the various tube-inhabiting marine worms. The earth-worm is common on shore, with many different active larvæ, supposed to be of *Podura* and *Curculio*. The *Echinodermata* are well-represented, specimens having been preserved of *Holothuria*, *Ophiuridea*, (from 12 fathoms,) star-fish, (three species,) and spatangoid sea-urchins. The last were dredged from 5 and 12 fathoms. Several not conspicuous species of *Actinia*, two or three sponges, (partly vitreous,) and a few diatoms from the sea-water, complete the zoological list, so far as specimens have been preserved.

There is a considerable collection of *Algæ*, both pressed and dried, including the two huge species of antarctic kelp, concerning which so much has been said and written, (*Macrocystis pyrifera* and *D'Urvillea harveyi.*)

Such geological specimens as have been preserved were selected with a view to also illustrating the lichens which grow upon them up to 2,500 feet above the sea-level. Very large specimens of calcareous spar from holes in the rocks, and of silicified wood from the northern part of the island, have also been brought home. For the latter I am indebted to Mr. Maynard, bearer of dispatches to the commanding officer of the expedition.

All of the members of the party rendered me material assistance at one time or another, and I am particularly under obligations to Commander Ryan for often-repeated acts of kindness. I am also indebted to Dr. Gill, of the Smithsonian Institution, and to Dr. E. Coues, United States Army, for identification of the fish and many of the birds.

Meteorological register.

United States observing station, Kerguelen Island.—Latitude, 49° 21′ S.; longitude, 70° 15′ E.; altitude of barometer above sea-level, 130 feet.

September, 1874.	BAROMETER.			THERMOMETER.				WIND.		Remarks.
	8 a. m.	2 p. m.	8 p. m.	8 a. m.	2 p. m.	8 p. m.	Daily mean.	Direction.	Force.	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15			30.10					South by east		Cold and clear.
16	30.20		30.30			35		Southerly and westerly		
17	30.17	30.12	30.15	55	63	54	57.3	do		
18	29.93	29.70	29.70	64	55	48	55.7	Northerly and westerly	10	High gale, with rain, &c.
19										
20	30.11	30.11	30.03	48	52	41	47.0	Southerly and westerly	6	Overcast.
21	29.80	29.71	29.61	47	56	56	53.0	Northerly and westerly	5	Overcast; clear afternoon.
22	29.37	29.33	29.33	57	56	37	50.0	Northerly and easterly	7	Snow in afternoon.
23	29.47	29.55	29.55	34	38	32	34.7	West-northwest	8	Snow; clearing in afternoon.
24	29.38	29.38	29.52	39	42	50	43.7	Northerly and easterly a. m.; southwest, p. m.		Snow.
25	29.61	29.42	28.92	41	42	40	41.0	Southwest at 8 a. m.; northerly at 2 and 8 p. m.	10	Rain and strong gale.
26	28.80	28.79	29.00	32	34	23	29.7	Westerly	10	Gale continues; much snow.
27	29.28	29.50	29.73	25	33	24	27.3	do	10–11	Gale increasing; very heavy snow.
28	29.81	29.80	29.75	33	39	30	34.0	do	5–6	Cloudy; fresh wind.
29	29.30	29.17	29.20	37	45	33	38.3	do	Light.	Rain and snow; clear intervals.
30	29.16	29.12	29.14	43	43	31	39.0	Northerly	Light.	Partially clear; snow at night.
Monthly mean	29.60	29.52	29.60	42.9	46	38.14	42.36			

Meteorological register.

United States observing station, Kerguelen Island.—Latitude 49° 21′ S.; longitude 70° 15′ E.; altitude of barometer above sea-level, 130 feet.

October, 1874.	BAROMETER.			THERMOMETER.				WIND.		Remarks.
	8 a. m.	2 p. m.	8 p. m.	8 a. m.	2 p. m.	8 p. m.	Daily mean.	Direction.	Force.	
1	29.27	29.31	29.31	50.00	47	35	43.0	Northerly	Light.	Clear and pleasant; cloudy intervals.
2	29.32	29.35	29.37	43.5	40	31	38.0	Southerly and westerly	.....	Snow in forenoon; clear at night.
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	29.63	29.72	29.72	42.5	35	30	35.8	Northeast	.....	Snow at intervals.
5	29.10	28.83	28.87	31	41	31	34.3	N. E. 8 a. m., N'd & W'd 2 & 8 p. m	8	Heavy snow; squally.
6	28.81	28.87	28.99	33	35	29	32.3	Northward and westward	8	Snow all day; high wind.
7	29.09	29.27	29.70	36	39	32	35.7	Westerly	7	Do.
8	29.89	29.79	29.58	50	38	37	41.7	Westerly a. m., northerly p. m	Light.	Clear forenoon; frequent snow and rain in afternoon.
9	28.79	28.87	29.05	54	43	31	42.7	Northward and westward	.....	Occasional snow; heavy at night.
10	29.55	29.75	29.90	28	32	30	30.0	Westerly	8	Snowed all night; clear afternoon.
11	29.67	29.45	29.30	42	48	38	42.7	do	.....	Clear; unusually high and low tide.
12	29.10	29.02	29.00	35	41	30	35.3	.....	.....	Snow; very heavy in afternoon.
13	29.08	29.12	29.32	38	41	32	37.0	.....	.....	Snow all day; brief intervals.
14	29.57	29.57	29.67	32	36	27	31.7	Northwest	9	Heavy snow all day; strong gale.
15	29.97	29.97	29.94	35	46	32	37.7	Southerly	5	Clear and pleasant.
16	29.69	29.67	29.75	46	46	37	43.0	do	3	Overcast; no snow or rain.
17	29.63	29.35	28.99	45	46	46	45.7	Calm 8 a. m., N. and E. p. m	0–10	Calm morning; violent gale, with rain, by noon.
18	28.74	29.00	29.37	45	35	31	37.0	Southward and westward	.....	Clear until 12 m.; snow all afternoon.
19	29.30	29.40	29.37	43	42	37	40.7	Southerly	8	Clear until 12 m.; rain, hail, and snow in afternoon.
20	29.27	29.27	29.32	44	46	34	41.0	Westerly	8–9	Occasional snow-squalls.
21	29.64	.....	.....	45	.....	.....	.....	do	8	Frequent snow-squalls.
22	29.56	29.46	29.11	49	51	47	49.0	N. & E. 8 a. m., N. & W. p. m	6–10	Hazy morning; rain at noon; gale at night.
23	29.17	29.22	29.19	50	37	37	41.3	Northerly and westerly	9–7	Frequent snow, ceasing in afternoon.
24	29.11	29.10	29.22	50	39	36	41.7	do	10	Gale; frequent snow all day.
25	28.72	28.85	28.89	38	40	35	37.7	.....	Light	Snow all day.
26	28.87	28.86	28.97	45	44	32	40.3	Westerly	Light.	Clear morning; snow from 11 to 2.
27	28.94	28.94	28.92	41	41	34	38.7	do	Light.	Clear morning; snowy in afternoon; 6½ feet tide.
28	29.03	29.07	29.12	44	43	34	40.3	West by north	7	Occasional snow-squalls.
29	29.11	29.23	29.35	41	47	33	40.3	Westerly	Light.	Clear morning; snowy afternoon.
30	29.60	29.60	29.55	49	52	34	45.0	Northwest	6–7	Clear with occasional snow.
31	29.45	29.47	29.53	35	41	34	37.7	.....	.....	Overcast; heavy snow after 11 a. m.
Monthly mean.	29.36	29.39	29.32	41.97	41.6	34	39.2	.....	.....	

Meteorological register.

United States observing station, Kerguelen Island.—Latitude, 49° 21′ S.; longitude, 70° 15′ E.; altitude of barometer above sea-level, 130 feet.

November, 1874.	BAROMETER.			THERMOMETER, DRY.			THERMOMETER, WET BULB.			DEW-POINT.		
	8 a. m.	2 p. m.	8 p. m.	8 a. m.	2 p. m.	8 p. m.	8 a. m.	2 p. m.	8 p. m.	8 a. m.	2 p. m.	8 p. m.
1												
2	29.76	29.83	29.75	40	55	43						
3	29.60	29.56	29.70	50	51	35						
4	29.67	29.64	29.65	43	49	41						
5	29.60	29.73	29.77	45	53	40						
6												
7	29.51	29.64	29.76	41	45	33.5		42				
8	29.87	29.84	29.91	42	44	35.5		41			35.5	
9	29.86	29.80	29.74	44	47.2	48.75		43	46		41.7	
10	29.87	30.00	30.03	43	53	37	40	47.75	35	35.6	40	32.5
11	29.80	29.55	29.31	35	37	34						
12	29.25	29.34	29.37	42	49	37	41	45	35.5			
13	29.52	29.50	29.30	41	50	39.5	40	48	37	37.4	45.5	34
14	29.22	29.25	29.35	48	60	43	46.5	58	41	45.7	56.8	39.7
15	29.62	29.76	29.91	39	37	36.5		36	34.5		35.4	33.25
16	30.03	30.08	30.16	43	52	50.5		49.5	49		47	47.3
17	30.30	30.30	30.29	46.5	57.5	45.5	40	55	44	29.3	51.8	42.26
18	30.31	30.27	30.20	50	48.5	42	56	46	41.5	53.25	42.8	41
19	29.90	29.70	29.85	52	59	40	51.5	57.5	37	50.9	56.5	32.36
20	29.90	29.78			41	48		41	45		37	41
21	29.85	29.86	29.91	38.5	43	37	37	39	34.5	34.33	33	29.16
22	30.03	29.99	29.73	45	54	49	40		47	32		44.8
23	29.72	29.77	29.75	45	49.5	40		47	36		44	29.12
24	29.42	29.21	29.17	48	60.5	49	47	58	47.5	45.8	56	46
25	29.18	29.44	29.60	45.5	46	36.5	35	41	33.5	33.2	37.6	29
26	29.83	29.93	29.96	45.5	46	43	43		38.5	41.2		35.3
27	29.91	29.86	30.01	54	56	43.5	53	51.5	40	52	47.2	36.9
28	29.91	29.74	29.76	44.5	60	47.5	41	57.5	45.5	38.1	55.3	43.9
29	29.90	29.84	29.58	43	49	50	42.5	48.5	48	41.9	47.9	45.9
30	29.29	29.55	29.51	50	48	40	48	44	37.5	45.9	39.6	34.2
Monthly mean	29.73	29.74	29.74	44.9	50	41.6	43.8	47.44	40.6	41.1	44.8	37.7

Meteorological register—Continued.

United States observing station, Kerguelen Island.—Latitude, 49° 21′ S.; longitude, 70° 15′ E.; altitude of barometer above sea-level, 130 feet.

November, 1874.	SATURATION, (PER CENT.)			WIND.		RAIN.	Remarks.
	8 a. m.	2 p. m.	8 p. m.	Direction.	Force.	Inches.	
1	.....	.....	.....	Northwest	.....	.....	Occasional snow in morning.
2	.....	.....	.....	..... do	7–9	.....	Overcast; no snow.
3	.....	.....	.....	Westerly	Light.	.....	Clear.
4	.....	.....	.....	..... do	8–9	.....	Clear and pleasant.
5	.....	.....	.....	..... do	8–5	.....	Clear morning; afternoon overcast.
6	.....	.....	.....	Northeast	3–10	.....	Overcast; rain and high gale p. m.
7	.....	.61	.....	North & west, & south & west	7–9	.....	Snow-squall; clear at noon; snow p. m.
8	.....	.75	.....	Westerly	8–0–6	0.96	Snow a. m.; clear p. m.
9	.....	.81	.90	..... do	8–5	.....	Overcast; occasional rain.
10	.75	.66	.81	Southerly	4–2	.....	Overcast.
11	.....	.....	.....	Southerly and easterly	8–5	.....	Heavy snow.
12	.92	.73	.80	Southerly	5–4	.....	Misty.
13	.90	.85	.81	Calm and southerly	0–2	.....	Cloudy a. m.; light rain in evening.
14	.92	.88	.88	Southerly and westerly	2–6	.01	Cloudy.
15	.....	.90	.95	Southwest	6	.008	Completely covered; clear afternoon.
16	.....	.83	.88	..... do	2–3	.....	Completely covered.
17	.66	.80	.88	Southerly and westerly	2	.005	Clear; light rain at noon.
18	.81	.80	.96	Southerly and northerly	2–7	.....	Overcast, with clear intervals.
19	.97	.91	.74	Northerly and westerly	6–9	.....	Rain and frequent sharp squalls.
20	.....	.77	.78	Northwest	7–5	.146	Overcast; clear intervals; sharp squalls.
21	.86	.68	.73	Northwesterly	5–8	.026	Overcast a. m.; frequent snow-squalls p. m.
22	.61	.....	.85	West	6–9	.05	Clear; cloudy p. m.
23	.....	.81	.65	..... do	7–2	.....	Clear.
24	.92	.85	.91	S. W. at 8 p. m., E. at 2 p. m., and S'y at 8. p. m.	3–6	.....	Cloudy, with occasional rain.
25	.96	.63	.60	Northerly and westerly	8–9	.....	Clear a. m.; frequent snow squalls p. m.
26	.85	.....	.80	Southwest	2	.04	Rain, clearing in afternoon.
27	.93	.73	.81	Westerly	9–2	.....	Cloudy; occasional sunshine; completely covered at night.
28	.80	.85	.90	Southerly	1–2	.....	Light rain, morning and evening; clear at noon.
29	.96	.97	.86	Northerly and easterly	3–6	.04	Fine rain all day.
30	.86	.73	.80	Westerly	3–9	.72	Clearing off in afternoon.
Monthly mean	.855	.792	.823			0.200	

Meteorological register.

United States observing station, Kerguelen Island.—Latitude 49° 21′ S.; longitude 70° 15′ E.; altitude of barometer above sea-level, 130 feet.

December, 1874.	BAROMETER.			THERMOMETER, DRY.			THERMOMETER, WET BULB.			DEW-POINT.		
	8 a. m.	2 p. m.	8 p. m.	8 a. m.	2 p. m.	8 p. m.	8 a. m.	2 p. m.	8 p. m.	8 a. m.	2 p. m.	8 p. m.
1	29.58	29.61	29.70	45	46.5	37	44	45	36.5	42.8	44.5	35.8
2	30.03	30.05	29.92	42.5	49.5	41	.....	44.5	38	.....	40.2	34.2
3	29.56	29.71	29.83	51	49.5	40.5	48.5	49	37.5	44.9	48.4	33.6
4	29.92	29.92	30	57	57.5	45	55	51	43	53.2	45.1	40.7
5	29.85	29.73	29.49	64	65	50	60	59	47	56.7	54.1	43.8
6	29.59	29.52	29.46	44	50	36	41	46	35.5	37.5	41.8	34.7
7	29.60	29.67	29.57	52	51	40	.....	47	39	.....	42.8	37.7
8	29.34	29.22	29.18	49	52.5	42	46	48.5	40	42.8	44.5	37.5
9	29.12	29.18	29.19	51	49	49	48	47	47	44.9	44.8	44.8
10	29.44	29.53	29.59	46	54	41	44	50	39	41.7	46.1	36.5
11	29.39	29.40	29.46	49	53	42	48	50	39	46.9	47	35.3
12	29.63	29.72	29.86	48	51	35	45	45	32	41.7	38.3	28.5
13	29.88	29.97	29.83	50.5	48	45.5	48	45.5	42.5	.....	.....	.....
14	29.77	29.73	29.64	55	62	46	54	60.5	44	.....	.....	.....
15	29.11	29.22	29.44	51.5	50	36.5	49	48.5	35	.....	.....	.....
16	29.54	29.48	29.54	45.5	56	48	45	53	46	.....	.....	.....
17	29.43	29.53	29.62	54	54	46	.....	50	42	.....	.....	.....
18	29.59	29.55	29.64	55.5	48.5	40	52	45.5	38	.....	.....	.....
19	29.70	29.71	29.45	46	47	48	44.5	45	47.5	.....	.....	.....
20	.....	29.06	29.16	.....	60	48	.....	58	46	.....	.....	.....
21	29.33	29.36	29.50	44	45	48	41	42	46	.....	.....	.....
22	29.72	.....	29.95	43	.....	40	41	.....	37	.....	.....	.....
23	30.05	30.03	29.94	52	50	40	48	47.5	37.5	.....	.....	.....
24	29.58	29.54	29.61	43	55	43.5	41	53	40	.....	.....	.....
25	29.55	29.49	29.58	44	58.5	49	42	.....	49	.....	.....	.....
26	29.23	28.86	28.73	50.5	54	47	49.5	52.5	46.5	.....	.....	.....
27	28.82	29.16	29.18	44.5	44	41.5	.....	.....	.....	.....	.....	.....
28	29.47	29.50	29.56	47	50	45	46.5	48.5	42.5	.....	.....	.....
29	29.39	29.43	29.42	52	58.5	46	50.5	50	43.5	.....	.....	.....
30	29.42	29.37	29.39	46	44	40	45.5	42	39.5	.....	.....	.....
31	29.35	29.35	29.46	47.5	48.5	39	45.5	45	38	.....	.....	.....
Monthly mean	29.53	29.39	29.54	49.02	52.05	43.2	47.03	47.07	41.13	45.31	44.77	36.91

Meteorological register—Continued.

United States observing station, Kerguelen Island.—Latitude 49° 21′ S.; longitude 70° 15′ E.; altitude of barometer above sea-level, 130 feet.

December, 1874.	SATURATION.			WIND.		RAIN.	Remarks.
	8 a. m.	2 p. m.	8 p. m.	Direction.	Force.	Inches.	
1	.92	.97	.95	Northerly and westerly	9–10	.14	Snow, with clear intervals; very high wind.
2	.....	.75	.77	Westerly	6	.04	Partially clear.
3	.80	.96	.77	....do	6–9	.01	Cloudy, with partly clear intervals.
4	.87	.61	.85	....do	5–6	.....	Clear; cloudy toward night.
5	.77	.68	.80	Northerly and westerly	8–10	.....	Overcast; sharp squalls, with rain.
6	.77	.74	.95	Southerly and westerly	2–3	.009	Overcast.
7	.....	.74	.92	Southerly	3–5	.03	Overcast; fine rain.
8	.79	.75	.85	Northerly and westerly	4–3	.114	Overcast; light rain; partly clear p. m.
9	.80	.86	.80	South	2–3–2	.....	Completely covered; partly clear in morning.
10	.86	.74	.84	Northerly and westerly	7–5–3	.01	Partially clear and overcast.
11	.93	.80	.78	....do	8–10	.03	Occasional squalls, with fine rain.
12	.79	.63	.79	Westerly and southwesterly	7–1	.01	Occasional rain and snow-squalls; clear evening.
13	.....	.....	.....	Northerly	6	.....	Overcast and squally.
14	.....	.....	.....	Westerly	6–9	.092	Rainy, with squalls.
15	.....	.....	.....	Southwesterly	4–7–9	.286	Rain and snow, with sharp squalls.
16	.....	.....	.....	Northerly and westerly	11–10	.06	Exceedingly heavy gale, with rain.
17	.....	.....	.....	Westerly	9–5	1.14	Gale moderating; rain-squalls.
18	.....	.....	.....	....do	7–5	.324	Clear morning and evening; rain-squalls at noon.
19	.....	.....	.....	.... do	7–9	.088	Overcast; heavy rain toward night.
20	.....	.....	.....	N'y at sunrise; W'y at 8 p. m.	10–4	1.2	High gale, with much rain; clearing p. m.
21	.....	.....	.....	Westerly	5–7	.426	Clear a. m.; snow at noon.
22	.....	.....	.....	West and southwest	5–8	.01	Occasional snow-squalls.
23	.....	.....	.....	Southwest and northwest	5–7	.....	Clear morning; cloudy afternoon.
24	.....	.....	.....	Northeast and northwest	11–3	.4	Very high gale, with much rain; moderating in afternoon.
25	.....	.....	.....	Northwest and northerly	7–5	.324	Rain; cloudy afternoon.
26	.....	.....	.....	Northerly and northwest	10–8	.666	Heavy rain early in morn'g and towards night; very high wind.
27	.....	.....	.....	Westerly	10–6	.55	Partially clear.
28	.....	.....	.....	....do	9–6	.....	Do.
29	.....	.....	.....	Northwest	9–5	.14	Rain, with sharp squalls during night and day.
30	.....	.....	.....	Southeasterly and southerly	3–2	.08	Rain; occasionally clear.
31	.....	.....	.....	Northwest	4–8–7	.124	Rainy and overcast; high wind p. m.
Monthly mean.	0.83	0.77	0.84			0.252	

APPENDIX.

SANITARY REPORT,

UNITED STATES STEAMER LANCASTER,

SOUTH ATLANTIC SQUADRON,

1875.

SOUTH ATLANTIC SQUADRON,

1875.

REPORT OF FRANCIS V. GREENE, M. D.,

Acting Passed Assistant Surgeon U. S. Navy.

U. S. S. LANCASTER.

HYGIENE.

The complement of this vessel, as given in the allowance-table, is 455, but, as this number has never been reached during the present cruise, in the yearly reports the calculation of the cubic air-space allowed each individual has been based on the number actually on board at the end of the year, which was considered a fair average. Thus, in the report of January 1, 1875, with the complement taken at 378, the cubic air-space on the gun-deck, from the pantry bulk-heads to the forward bitts, was found to be 34,566 cubic feet, giving to each of the 221 individuals berthed on that deck an air-space of 156 cubic feet; and the air-space on the berth-deck, from the wardroom bulk-head to the sick-bay, was placed at 23,582 cubic feet, or 168 cubic feet for each of the 140 individuals sleeping in that part of the ship. The average air-space for the two decks was, therefore, 161 cubic feet for each individual.

During the first quarter of the present year the number actually on board was 417, which was reduced during the second to 392, giving an average of 404 for the half-year. This difference being due not only to an increase in the number of the crew, but also to changes among the officers by transfer and

death, it has been necessary to recalculate the averages in the condensed table accompanying the last report, and to present the modified result in the subjoined tabular statement. The amount of space occupied by each individual, with his hammock and bedding, which was not included in the incumbrances in the last table, has been taken at 6 cubic feet, which is about a fair average, and the total (2,304 cubic feet) deducted from the sum of the cubic air-space of both decks.

The following shows the amount of cubic air-space allowed each individual on board for the half-year ending June 30, 1875:

Gun-deck, 33,048.125 cubic feet; average per individual, 130.62. Berth-deck, 22,796.5 cubic feet; average per individual, 174.02. Average number of cubic feet per individual on gun and berth decks, 145.43. Sick-bay, 3,006.28 cubic feet; average per individual, 420.49. Admiral's cabin, 2,172.5 cubic feet; admiral's state-room, 625; total, 2,797.5. Captain's cabin, 1,419.5 cubic feet; captain's state-room, 625; total, 2,044.5. Wardroom, 10,776 cubic feet; average per officer, 718.4. Steerage, 993.58 cubic feet; average per officer, 331.19.

The total number of sick-days for the half-year is 2,431, giving, with the average complement of 404, a percentage of 3.32. Three deaths have also occurred during the same period, making a mortality of .74 of one per cent.

Ventilation.—From the accompanying appended diagram, which represents a vertical section made through the median line of the vessel, it will be seen that this ship is well supplied with large hatchways on all the decks. The position of the wind-sails, five in number, during good weather, is indicated on the diagram, which also shows the decks on which they open. The lateral openings consist of eighteen gun-ports on each side of the gun-decks, and on the berth-deck of thirty-two circular air-ports, twenty-two on the berth-deck proper and ten in the wardroom. With these means of permitting the entrance

of the external air, the ventilation may be considered as very good in clear weather, with a smooth sea and a fair breeze. At sea, the air-ports on the berth-deck are generally closed, and, in rainy weather, the gun-ports are likewise shut, the wind-sails drawn up, and the hatchways covered. Under these circumstances, the air soon becomes very much vitiated both on the gun and berth decks, and the peculiar odor imparted to a confined atmosphere by the organic matter (the *miasme humain* of French writers) thrown off by the skin and lungs is noticed by every one who has occasion to traverse these decks after the men have been in their hammocks for an hour or so, clearly proving that very little dilution or change is taking place in the insufficient air-space into which so large a number of men are crowded. With regard to the wind-sails, it will be noticed that the one in the forward hatchway passes to the forward orlop-deck, that in the fore-hatchway to the fore-hold, and the one in the steerage-hatchway to the main-hold, thus leaving the entire berth-deck unsupplied with external air, except by the two wind-sails opening into the wardroom. The regulations furthermore require that the fore-hold shall be closed and locked at a stated hour every evening, and until lately the wind-sail passing into this place was merely drawn up and thrown on the deck without being utilized on the berth-deck. From the time this vessel deviated from her homeward-bound course to put into Bahia, for sanitary reasons, the question of procuring as thorough ventilation as possible in every part of the ship becoming one of paramount importance, and at my suggestion the wind-sails in the forward and fore hatches were so arranged as to open on the berth-deck, the result being a marked improvement both in the temperature and the character of the air. Two stationary metallic ventilators descend through the hatchway to the fire-room, and as this and the engine-room hatch are surrounded by bulkheads on the gun and berth decks, proper currents of air ap-

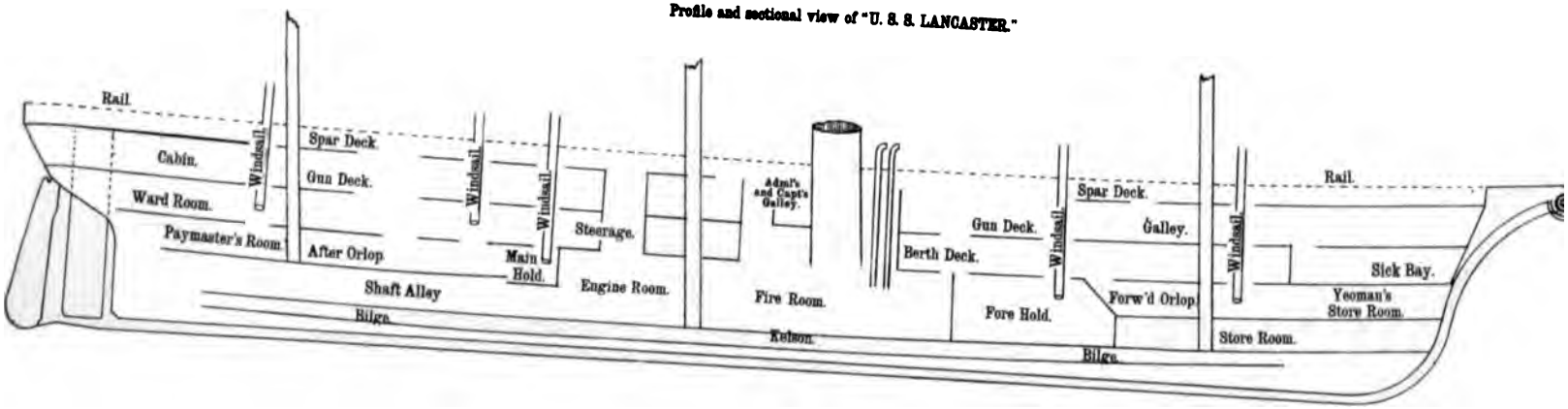
pear to be established. When steaming, a wind-sail is also led to the lower part of the fire and engine rooms, and a low temperature with fair ventilation secured.

Attention having been directed in the last report to the position of the sick-bay, it is only necessary to state that, in addition to its being situated in the worst-ventilated part of the berth-deck, it is rendered still more unsuitable for the treatment of the sick by leakage from the decks above. (See diagram.)

Immediately abaft the sick-bay on either side is a cell, built entirely of solid bulk-heads, with the exception of an iron-barred opening in the door, nineteen inches wide by twenty in height, at a distance of forty-four inches from the deck. These cells, with an air-space of only 87.5 cubic feet each, have not infrequently been used as places of confinement for more than one offender at a time, and this for several consecutive days. "Sweat-boxes" have in name disappeared from the service, but of what avail a reform of this kind if it be permitted to construct cells, which can at any moment be converted into veritable "sweat-boxes" by crowding into them a number of individuals? A case of the kind is still fresh in my memory, where six men were huddled together in a cell of the size mentioned above, but who were promptly released on my representing that there was every probability of several deaths from suffocation. As abuses of a similar nature are likely to occur, if such places are necessary on board, the greatest care should be taken to insure a very liberal supply of fresh air.

Ordinarily the bilge of this vessel has been in very good condition; but for months past complaints were almost daily received from the yeoman concerning the foul condition of the air in the fore-peak. Large quantities of disinfectants were furnished from time to time, but as they only caused a temporary abatement of the nuisance, on the 4th of May last it was decided to make a close inspection of that part of the ship, when it was discov-

Profile and sectional view of "U. S. S. LANCASTER."



ered that that portion of the bilge extending from the orlop deck to the fore-hold was closed at each end by a solid bulk-head. Openings were made at either end, and after the space had been well aired, the bilge was scraped, and between two and three hundred pounds of very offensive slime, containing both animal and vegetable matter removed; the whole space was then thoroughly washed out, disinfected, and whitewashed. Since then there have been no complaints of foulness in the fore-peak. From information derived from an officer who was on board this vessel in the Pacific, I learned that at that time the bulk-heads referred to were furnished with valves, and as no alterations were made in this part of the ship on the South Atlantic station, it is clear that the closed bulk-heads were put in at the Norfolk navy-yard, a piece of carelessness that might at any time within the last six years have caused serious and extensive sickness on board.

In the condensed table of cubic air-space the average per officer in the wardroom is given as 718.4 feet. This would be a very fair allowance, if the wardroom were only so constructed as to give the benefit of this amount. Unfortunately, however, the sleeping-apartments are separated from the country by solid bulk-heads, open only at the upper part, and, as 88.6 cubic feet have to be deducted for the furniture, there remain only 247.4 feet of actual air-space; consequently, only a small amount of air penetrating through the openings referred to, very little change is effected in the atmosphere, which will explain the lassitude, headaches, and other unpleasant feelings with which the officers leave their rooms in the morning. The suggestion that the bulk-heads of all sleeping-apartments should be latticed from top to bottom should be adopted as the best means of remedying the evil; and further, the erection of solid bulk-heads should be prohibited in all parts of the ship in which it is possible to dispense with them.

If by the ventilation of a vessel is to be understood the removal, by a pure current of external air, of that vitiated by pulmonary and cutaneous exhalations, the effluvia from the sick, the products of combustion, the impurities derived from the bilge, provisions, and other sources capable of adding noxious principles to the internal atmosphere, from what has been stated above, in regard to the avenues by which air from without penetrates into the vessel, and the instances given where obstacles have been opposed to the free circulation, it must be conceded that this object is but imperfectly attained on board, no systematic attempt having been made to accomplish so desirable an end. The air entering through the hatchways and ports most generally does very little more than produce a number of draughts, passing out of the ship without much influence on the great bulk contained within. Of wind-sails and ventilators, Mahé, in his Naval Hygiene, edition of 1874, remarks that they "are undoubtedly of some use in purifying the air," but that "they only create in the vast flanks of the vessel columns of air that are insignificant in comparison with the imprisoned mass, which they scarcely affect in its entirety." Allowing that these means are not entirely sufficient to properly dilute or renew the air, still, with careful inspection, the changes in the direction of the currents, under different circumstances of wind and weather, could be ascertained, and, if the medical officer were supplied with an anemometer to measure the velocity of the air through the outlets, errors in position of the inlets might be corrected and deficiencies in number supplied that would otherwise be overlooked.

As the vessels of our Navy are used almost entirely under sail, in the introduction of any means of ventilation that will answer under all circumstances, the system of extraction with heat must of necessity be excluded. Ventilation by propulsion, although efficient in many respects, presents the great disad-

vantage of difficulty of distribution; and, as Parkes remarks, "if the air enter through small openings, at a high velocity, it will make its way to the outlets without mixing." The method in which it is proposed to have a number of tubes leading from the hold and sides of the ship, which shall open into the masts, which are made hollow for the purpose, appears to be based on sound theoretical views, and, according to Mahé, has given excellent results in the instances where it has been applied. What is known as the McKinnell tube appears to offer superior advantages to any of the plans as yet proposed for the ventilation of vessels, and I have no doubt the ingenuity of our mechanics would soon solve the problem of the proper method of applying the system to our ships. In England these tubes have already been introduced into a number of hospitals, public rooms, and other places where individuals are thrown together, and in all instances they have been found to do their work in a satisfactory manner. As the outlet-tube is contained within the one acting as an inlet, space is in this way economized, and, as the diameter of the tube is proportioned to the space to be acted on, by a proper distribution, the separate and independent ventilation of each deck, or even the divisions thereof, could be effected.

Lighting.—The only point in this connection not mentioned in the last report is in regard to the air-ports of the berth-deck. These are the old-fashioned circular openings, eight inches in diameter, closed by unwieldy plungers, and through them a very insufficient quantity of light is admitted to the berth-deck and officers' state-rooms. They should be removed, and their place supplied with the modern improvements, by which better illumination and greater ventilation are secured.

Warming.—Steam-heaters were furnished this vessel in 1869, but as the tubes for connecting them with the boilers were not supplied at the same time, and have not been required since,

they have never been placed *in situ*. This appears to have been an oversight, as, notwithstanding the thermometer rarely falls low enough on the South Atlantic station to make it necessary to warm the ship for personal comfort, still the heat distributed throughout the vessel in this way would have been very efficacious in lessening the humidity always prevailing, and in this way improving the condition of the internal atmosphere and arresting or retarding the innumerable processes of decay that are always in operation.

Water.—As the water-tanks on board this vessel have a capacity of 21,000 gallons, allowing a plentiful supply for thirty days, the greater part of the water consumed during the cruise was obtained from shore, the necessity of distilling seldom occurring during the short periods required to pass from one port to another on the Brazilian coast.

The water-supply of Rio de Janeiro, derived from the small streams in the mountains of the vicinity, is brought into the city over several large and finely-constructed aqueducts, and finally distributed by fountains placed in the different sections. This water, which is noted for its purity, was brought alongside in well-constructed and clean boats, and was always found to be above the ordinary standard in regard to clearness and freedom from saline and organic matter.

The city of Montevideo is supplied with water from the Santa Lucia River, the water-works being situated at a distance of about forty miles from its mouth. In the last report this water is spoken of as "never being clear," and as containing "innumerable animalcula, and many of the alkaline salts." Such may possibly be the case after heavy freshets, but, as far as I have been able to ascertain, that ordinarily delivered from the reservoir is quite clear, and is considered of excellent quality and in no way injurious to health. As regards the supply received on board from this source, careful examinations

by the late Dr. Fassig and myself determined the fact that it possessed all the physical qualities of a good potable water, while the chemical tests proved that it contained salts and organic matter in quantities too small to be considered detrimental to health. Moreover, the animalcula referred to were not microscopic, and were probably some variety of the hydrozoa or entomostraca, which, being found in so great a number of streams furnishing what is considered good potable water, are not ordinarily deemed to affect the water injuriously. In connection with this water, the writer also regretted that "owing to the want of proper apparatus and reagents" he was "unable to determine its chemical composition." As these works have been erected within a few years, in the selection of a source of supply, the question of obtaining as pure a water as possible must have been a very important one to determine at the very outset; and I have little doubt that slight inquiry would have brought to light the fact that analyses by chemical experts are in existence by which the superiority of the Santa Lucia water over that of other sources that might have been selected has been clearly demonstrated. While I believe that it would be well to supply the medical department with the few pure chemicals required to determine qualitatively the acids and bases ordinarily contained in potable waters, I by no means deem it necessary for the Bureau to furnish an outfit for quantitative analysis, as gravimetric examinations are necessarily tedious, and require an amount of care and delicacy of manipulation that can hardly be bestowed on board ship. Furthermore, close attention to the physical characters of a water will furnish some clew to its adaptability for potable purposes, while evaporation will establish the quantity of solids contained in the gallon, and incineration the amount of organic matter. As, however, during the cruise of any vessel, water may be brought alongside from sources about which nothing is known, it would

be well for the department to be supplied with the apparatus for volumetric analysis, as examinations of this kind can be made in a short space of time, and answer all the purposes of the more elaborate, and, on board ship, almost impossible quantitative analyses.

Before leaving Bahia for the United States, the tanks were filled with water from shore, which was found to be quite clear, with only a slight percentage of salts. It was also remarkably free from organic matter. The above are all the ports visited by the ship since I joined the squadron, and I am unable to give any account of the water at other points on the station, which I suppose, however, has been done in former reports.

On the long passages made by this vessel within the last two years, the distilling apparatus has been frequently called into requisition. The water leaving the distiller was pumped to the spar-deck, where, passing through a hose, it became sufficiently aerated to be conducted by a hose to the tanks, where it arrived at a comparatively low temperature. After cooling, it was always found to have a very good taste, and to be almost devoid of saline matter. The only exception to this occurred during the late passage from Bahia, when the water being found to contain about 46 grains of solid matter to the gallon, it was deemed advisable to suspend the distilling and examine the apparatus. Two leaks in the tubes were discovered and repaired; and on resuming the distillation, as the water then contained only a few grains to the gallon, the tanks were filled. No injurious effects have been noticed.

Food.—The present Navy-ration gives to the men an abundant supply of food of excellent quality, and where, as in this ship, two or three rations are commuted in each mess, fruits, vegetables, and other articles relished by the crew can be purchased when in port to add variety to their diet. The prejudice existing in the minds of sailors against preserved meats and desic-

cated vegetables should be removed by cooking these articles properly and carefully, as they appear to be prepared with every attention necessary to secure their preservation in good condition. In the course of time, as the men became habituated to their use, the number of days for serving out salt provisions might be decreased with benefit to the health of the crew. The supply of fresh provisions, while in port, is as liberal as could be desired.

Clothing.—The only particular in which it seems necessary to make an addition to the clothing already furnished is in the undershirts, which are now made entirely of heavy flannel. A small number of some lighter material, preferably of white color, as more readily inspected, should also be supplied, as in warm weather the men often cease wearing the heavy article, and, in so doing, run great risks of contracting severe pulmonic or rheumatic affections. The buttoning of the sleeve of the overshirt tightly around the wrist, at variance with sound hygienic principles, should be abandoned. The addition of a false cuff of the same heavy material, ornamented, or rather disfigured with white tape, is simply an absurdity. The present cap so violates well-known principles of physics and hygiene, as regards its weight, shape, and color, that it should be discarded from the service, and something substituted that would protect the head, and at the same time permit a free circulation of air.

General hygiene.—Next in importance to proper ventilation, and in reality deducible from it as a corollary, is the maintenance of the purified atmosphere in a dry condition. The actual state produced by the constant washing of the decks, frequently all three at the same time, has been so forcibly presented in the last report, that I shall merely remark in this connection that probably, by adopting the suggestion of Medical Inspector Gibon, that hygrometric observations should be conducted on board ship by the medical officer and reported quarterly, it is barely possi-

ble that those in authority might learn tha
air in the interior of their ships is ordina
of the external atmosphere, and that th
"night-orders" in accordance with this k

On board this vessel twenty-nine men ar
and engine rooms, and thirty-seven on the
duties in the engineer's department have
eral rule, during the cruise, the men, with
have enjoyed excellent health. With reg
cooks the same hardly holds good, as all
less degree, exhibit evidences of the ill-ef
ally between decks. Out of the fifteen co
performing this duty during the whole
probably for the purpose of hoarding the
the anemic condition produced by the exc
and light is plainly observable in their cas
dition of these and other persons whose d
pass a considerable portion of their time i
the vessel should be frequently inquired in
appear to be suffering from the confineme
lieved from duty of this kind for short pe

The excessive use of white lead for pain
ment of both white and red lead in the e
to the extent now allowed, are points that
tion from the medical officer, as likely, wh
to lead to the establishment of insidious
ments of health. Those employed in prepa
coatings for the machinery, which are ma
tions of lead, should be warned of the del
compounds, and should be enjoined to cl
perform their ablutions carefully when the
to prevent the introduction of the poiso
either by cutaneous absorption or with th

CLIMATOLOGY.

All the points of interest in connection with the climatology of the coast of Brazil have been so thoroughly and ably discussed in the reports from this ship for the last two years that it is unnecessary for me to occupy space with any lengthy reference to this topic.

No blank forms having been supplied to the station, a meteorological register for the half-year, similar to the one forwarded to the Bureau in January last, has been made out, to be inclosed with this report.

For cruising-vessels the present form of register appears to be entirely useless, as affording information to be used for statistical purposes. For instance, that sent from this ship for the year 1874 contained observations collected in Key West during the naval drill, on the passage to Rio de Janeiro, while in that port, closing with the meteorology of the port of Montevideo for less than two months at the end of the year. It would be a laborious task to unravel such a mass of figures, in order to arrange them for tabular use. Moreover, the medical officer is forced to derive his data from the ship's log, and it is notorious not only that the instruments are not sufficiently accurate for meteorological purposes, but that the observations are recorded in so careless a manner that they are perfectly worthless for scientific use. With blank forms so constructed as to record separately the data collected in the different ports and on the various passages, and with accurate instruments, for which a place on deck should be allowed, where they could be protected in the manner recommended by meteorologists, a large amount of trustworthy information would soon be collected, from which important and reliable tables might be constructed. As the various changes in the atmosphere are being closely studied with reference to their effect on the cause, nature, and character of disease, in addition to the barometrical and thermometrical

observations now required, it would be desirable, instead of the rough guesses in the ship's log, to have the force of the wind estimated by the anemometer, already mentioned in connection with ventilation. Electrical phenomena should also receive attention, and likewise the condition of the atmosphere as regards the amount of ozone contained therein, with the conclusions arrived at in relation to the influence it exerts in purifying the air and destroying the germs of disease suspended in this medium.

MEDICAL TOPOGRAPHY.

The medical topography of Rio de Janeiro and Montevideo has been so recently treated of by our lamented fleet-surgeon,* and all the topics of professional interest so clearly and beautifully brought to the attention of the Bureau in the almost poetic language, in which he knew so well how to clothe the emanations from his pen, that I shall avoid the risk of repetition, and proceed to close this already lengthy report with a brief account of all the circumstances that either directly or indirectly led to the occurrence of yellow fever on board this vessel during the passage home.

News having reached the station that the Brooklyn had left Norfolk about the beginning of February last, Admiral Le Roy gave orders for this ship to be in readiness to leave Montevideo on the 22d of that month for Rio de Janeiro; but, on receiving a telegram that yellow fever had appeared in that city with a mortality of about fifteen a day, it was decided the vessel should remain in Montevideo until we received news of an abatement of the disease. At the same time orders were forwarded, to be delivered to the commanding officer of the Brooklyn on her arrival, advising him to consult with his medical officers as to the propriety of provisioning and remaining in the harbor, and

[* Medical Inspector E. R. Denby, United States Navy, who died of yellow fever on board the Lancaster, at sea, May 3, 1875.—H. C. N.]

if found dangerous to do so, to cruise off the port until the arrival of the flag-ship. The Brooklyn arriving in Rio de Janeiro on the 19th of March, and advices showing that the epidemic was not assuming greater proportions, we left Montevideo on the 27th of the same month, after having filled the bunkers with coal, on the representations of the fleet-surgeon, who gave it as his opinion that it would be highly dangerous to take coal on board from the island of Enchadas, which was generally one of the centers of infection in every epidemic.

Bearing in mind the teachings of Dutroulan, with his vast experience in the Antilles, and the opinion of various observers in other localities, that the type of the disease occurring after long and late rainy seasons was generally found to be very severe, with a large mortality in proportion to the number of cases, and, as heavy rains had been prevailing for some months in Rio de Janeiro, I doubted extremely the propriety of allowing two vessels to remain in that harbor under such circumstances, and expressed this view in a conversational way, my position not permitting any official expression of opinion. As this vessel contained a large amount of decaying timber, saturated with moisture from the oft-repeated drenchings of six long years, a condition of affairs most favorable for the development of the fever, if once introduced on board, I ventured to express the conviction that the proper plan would be for the exchange of officers to take place at Montevideo, and for this vessel to start for home from that port without visiting Rio de Janeiro. But the pleas of the impossibility of provisioning, except from the store-house, and of the necessity of taking on board the condemned stores, ordered by the Department to be brought home in this vessel, prevailed, and on the 10th of April last we were at anchor in the harbor of Rio de Janeiro.

On our arrival we learned that the disease still continued, with a mortality of about ten a day. We also ascertained that

the Brooklyn, after taking in stores from Enchadas Island, had suddenly left for Cape Frio, and the day after our arrival a telegram was received from that place, informing the admiral that, a case of yellow fever having occurred on board, the vessel had put to sea, and would return when reported advisable to do so by the medical officers.

Being on duty when the vessel came into port, as it was determined to bring the provisions on board for the homeward passage, I obtained permission from the fleet-surgeon to fumigate the holds and store-rooms with carbolic acid, and to treat the stores in the lighters in the same way before allowing them to come on board. On the 12th instant, it being reported that some of the men, who had been sent to the island on duty, had gone on board a vessel in which several of the crew had died of yellow fever, the admiral requested the fleet-surgeon to give him his opinion in writing as to whether it would be safe to bring on board the condemned clothing and to fill up with coal from Enchadas Island, and likewise to advise what additional measures should be taken for the preservation of the crew from disease. The next morning Dr. Denby requested me to accompany him to Enchadas Island. On our arrival, a careful inspection of the store-house, coal, and the ships alongside was made, and on our return the fleet-surgeon reported that the rumor concerning yellow fever at this point had been verified, there having been three fatal cases, out of a crew of nine men, on board a Norwegian bark discharging coal there, and one case on the only other vessel alongside at the time. With regard to the coal, it was reported that, having been discharged from vessels during the height of the epidemic, it was considered very hazardous to have it brought on board. It was further recommended that the men sent ashore or to the island on duty should be restricted as far as possible, and not allowed to wander about or visit merchant-ships, lest by so doing they might convey the disease on board.

Having had occasion during the past two years to visit Enchadas Island frequently as member of boards of survey, I am well satisfied, both from personal inspection and strict inquiry, that it is a very unsuitable place of deposit for the Government stores. In the accompanying appended chart of the harbor it will be noticed that this island is in close proximity to the anchorage for merchant-vessels, and during ebb-tide any infected matter from this source, as shown by the direction of the arrows, must almost of necessity lodge on its banks, where, being exposed to the rays of the sun for some hours, the atmosphere undoubtedly soon becomes impregnated with the poison. Several instances of places having become infected in this way have been recorded, in which no other explanation could be offered. One of the most conclusive of these is the epidemic at Governor's Island in 1870, reported by Assistant Surgeon Sternberg, United States Army, in which the only possible solution that could be arrived at to account for the introduction of the poison was that the infected matter had been carried by the ebb-tide from some vessels discharging cargoes on the Brooklyn side and deposited on a low point of land, in the vicinity of which the disease made its appearance. If a severe and extensive epidemic could originate in this way at an isolated Army station, where proper sanitary measures were carried out, how much more likely the frequent recurrence of yellow fever on an island like Enchadas, where no precautions are taken to exclude the disease. From what has been stated above concerning the condition of the Norwegian bark, it will be seen that even when vessels become infected they still remain alongside and discharge their cargoes, thus adding their quota of infection to the atmosphere. Moreover, the island is owned by a private individual, who rents the buildings to the Government, and likewise furnishes the coal used by the squadron. Under these circumstances, it was not surprising that in our visit of inspection all the employés denied

the existence of any disease at this point, and that we only learned the true state of the case by going to the vessels and interrogating those on board. From another source I also learned that about three weeks before the arrival of the Lancaster several vessels had suffered severely, losing a large percentage of all on board. As it is likewise certain that for some years past fatal cases have occurred at this place, it would seem desirable to select some other point in the harbor, where the stores might be so protected that they could be transferred to our vessels without fear of introducing disease.

During the cruise of this vessel in the Pacific, yellow fever, or what was supposed to be such, broke out shortly after leaving Acapulco, Mexico, and as the disease did not exist there at that time, it was concluded the infection must have been introduced in the coal taken on board at that place. Although quite likely that coal may sometimes be the means of introducing the disease on board ship, I do not partake of the opinion that it should never be received on board in an infected port. The evidence in regard to the nature and manner of introduction of the disease on a former cruise is not of a character to give it any weight; and the daily coaling of merchant-steamers in ports where the disease exists proves that the danger must be very slight. It was not therefore from any opinion that coal possesses any chemical or physical properties that make it particularly fit to act as a carrier or propagator of the disease that Dr. Denby and myself decided to report against receiving the coal from the island, but merely because it had been received there under conditions that rendered it very likely that either excreta, infected articles, or diseased germs from some source had lodged in it, and that the heat evolved, when in mass on board, might soon establish a center of infection.

Since cholera and typhoid fever have been demonstrated to be fæcal diseases, investigations in the same direction in regard

to yellow fever seem to prove that it also comes within the same category. Taking this view, the yearly re-appearance of the disease in the ports of Brazil is readily accounted for. In Rio de Janeiro the houses are built in quadrangular blocks, and no back outlets are provided by which offal can be removed. Although the government has established quite an extensive system of sewerage, very little advantage has been taken to secure proper drainage from private property, and the consequence is, in many parts of the city, the accumulation of decomposing animal and vegetable matter, which, when subjected to moisture and continued heat, presents the conditions required for the multiplication of any disease-germs lurking in its midst. Of the fact of the germs retaining their vitality for long periods in this section there can be very little doubt, as it is only on this hypothesis that the yearly outbreaks of the disease can be explained. The type of the epidemic appears to depend on some atmospheric conditions, which have not been investigated sufficiently to decide in what manner they exert their influence. In discussing the subject of the re-appearance of yellow fever in Brazil in 1849, Dr. Dundas, superintendent of the British hospital at Bahia, states that for some years previous remarkable changes had been taking place in the climatology of the coast, that the remittent fevers had gradually been losing their distinctive characters, and that in the summer, when the epidemic made its appearance, the usual daily thunder-storms were almost entirely wanting, and that during the continuance of the disease the atmosphere was stagnant and devoid of elasticity, with almost total absence of the regular sea-breeze; from which facts he argued the local origin of the disease, in opposition to the view advanced by other observers, that it was the result of importation from New Orleans. From the utter neglect of all sanitary measures, and the accumulation of offal and filth of all kinds in the overcrowded sections of the cities of the coast, it

does not seem improbable that the disease i
de novo at that time from some peculiar co
sphere. As the temperature at these poi
enough to destroy the germ, but only suffic
increase, the almost yearly recurrence of
readily explained by the absence of proper h
without recourse either to the local-origin t
portation.

As I did not visit the city during our lat
neiro, and as the communication with the sl
I am unable to give any detailed account
at that place. Moreover, I am not aware tl
medical officers of this vessel collected an
tend to throw any light on the subject. I f
my anticipations, that the type of the dise
enced by the long and late rainy season, ha
mortality having been very great in propo
attacked.

The anchorage selected for the ship was a
during our stay in the port the average rec
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through the greater part of the night. In th
temperature was much higher. In additi
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a large hill at the southern end of the wate
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sonably be expected that Rio de Janeiro,
surroundings, will become one of the garden

The United States steamer Monongahela arriving at Rio de Janeiro on the 19th of April, the admiral determined to transfer his flag to that vessel, in order that we might leave for home as soon as possible, no news having been received concerning the whereabouts of the Brooklyn. The transfer was accordingly made on the 21st of April, and the next morning we steamed up to the new flag-ship, saluted, and slowly proceeded out of the harbor, homeward bound, but without the usual manifestations exhibited on such occasions, a gloom apparently hanging over each vessel, a foreboding probably of the misfortune that was soon to overtake both.

On the evening of April 27, five days after our departure, Medical Inspector Denby was taken down with yellow fever, and the next morning Lieutenant Bolles and Master Murdock were added to the sick-list with the same disease. On the 3d of May, Assistant Surgeon Fassig was also attacked. The fatal result in three of these cases has already been communicated in my report, letters, and other official papers from Bahia, with such reference to the prominent features as to render it unnecessary to enter into the minutiæ in the present paper, as the details of the symptoms and treatment in these cases, as well as in that of Mr. Murdock, who recovered, will be found in the journal of medical practice of this vessel.

As the burial of two officers in one day was likely to have a depressing effect on the crew, I requested the captain to state, after the last service, that, in the opinion of the medical officers, the disease in all three cases had been contracted on shore, and that there was every reason to believe that the ship itself was entirely free from infection. The same evening, however, Assistant Surgeon Fassig being attacked with decided and unpromising symptoms, I was forced to adopt another view, as the origin in his case could be explained in two ways, either by his having contracted the disease in Rio de Janeiro, the period

of incubation not having expired, or by his having received the infection from those who had taken the disease on shore, some one or more of whom might have brought the disease-germs on board. The latter supposition did not seem at all improbable, as the doctor had several times stated to me he felt in case he should be on board ship with yellow fever he would contract the disease and not recover. As an ever-present dread of this kind operates powerfully on the system, increasing the susceptibility to the impression of disease-influences, it was natural to draw the conclusion that Dr. Fassig having been frequently and for long periods in the room of the officer whom, from the manner in which he had contracted the disease, I considered the most likely to have introduced the germs on board, he had probably been exposed to, and affected by, the infection lurking in the clothing or apartment. Entertaining a suspicion of this kind—for I cannot say that it ever amounted to a conviction—it became necessary to decide what course should be recommended in regard to the future movements of the vessel. Granting the probability of the existence of the disease-germs in the ship, it followed that others might be passing through the incubative period, and that a center of infection might already have been, or would shortly be, established, in which case a more or less extensive epidemic might be expected on board. With a passage before us of some forty or more days through the equatorial region, and the possibility of a long detention in the belt of calms on either side of the equator, where we would suffer not only from the heat, but still more from the want of ventilation, I concluded it would be eminently hazardous to continue our homeward-bound cruise. The next morning, therefore, I addressed a letter to the commanding officer, in which, after candidly stating the difficulty of deciding in regard to the origin of the disease in Dr. Fassig's case, I called attention to the possibility of the further extension of the disease, and recommended

that the vessel should be taken to Bahia, where, as this port was free from yellow fever, we could remain until it could be determined whether the ship was infected or not. Shortly after the receipt of the communication the vessel was headed for Bahia, where we arrived on the morning of the 9th of May.

From the first appearance of the disease on board, disinfectants had been used as liberally as the small supply on hand would allow, and, in addition to the employment of carbolic acid, Labarraque's solution, and nitrous-acid fumigations in the vicinity of the patients, particular attention was paid to the disinfection of the excreta and discharges from the stomach, care being taken that everything was properly disposed of in the "head," which was kept thoroughly washed and purified by carbolic acid. Immediately after Dr. Fassig's seizure a careful inspection was instituted in the deceased officers' rooms, and, as it appeared that some soiled articles had been accidentally placed in several drawers and lockers, all the clothing, with whatever else in these places appeared capable of retaining the infection, was removed and thrown overboard, after which the rooms were freely fumigated with nitrous acid. During the passage to Bahia a strong, cool, southerly breeze prevailed nearly all the time, and every advantage was taken of this circumstance to ventilate the ship thoroughly by opening the ports where possible, and by making some necessary changes in the disposition of the wind-sails. As previously mentioned, attention was also directed to the condition of the lower part of the vessel, and the entire bilge overhauled, cleansed, disinfected, and whitewashed.

Shortly after entering the port of Bahia the health-officer came alongside, and ordered the two yellow-fever cases to be sent on shore to the hospital. I very much regretted the necessity of this step in both cases; in that of Dr. Fassig, because, although there was a slight improvement in his condition, I con-

sidered his state too critical to warrant
Mr. Murdock's, on account of his being
requiring treatment in hospital. It is to
removal from the ship took place in an o
the passage to the hospital, a distance of
very rough and uncomfortable. On the
dock returned to the vessel, bringing the
Dr. Fassig had died the night before, hi
aggravated shortly after reaching the h
and a comatose condition toward the clos

Of the Hospital de Montserrat, I am u
from personal observation, as, in the first
and, afterward, the extent of my duties o
of my visiting the institution. In Kidde
Brazil and Brazilians, this hospital is s
pointed, which hardly agrees with Mr. I
of its present condition. The building, w
about 50 feet, and is two stories in heigh
chased by the government as a cholera
some years been devoted to its present
divided into small wards, containing from
The house is sadly in need of repair, an
sorry appearance from the falling off of
places. The beds and bedding are describ
the attendance is not spoken of in flatte
of lime appears to be the principal disi
institution. As had been reported to us
found the city of Bahia free from the d
cases in the shipping that had arrived f
Rio de Janeiro, all of which had been tran
During our stay in this port a cool south
to blow into the harbor, the average temp
age being 75°, the maximum 79°, and the

An offer of a medical officer to accompany us to the United States having been kindly made by Baron Ivanheimer, of the Brazilian navy, in answer to the inquiry of our commanding officer in regard to the necessity of assistance of this kind, I made a written reply, in which I carefully stated my reasons for entertaining the opinion that the disease would not re-appear on board. A copy of this letter was forwarded to the Bureau with my report in May last. Twenty-five days had at this time elapsed since our departure from Rio de Janeiro, which being far beyond the utmost limit assigned to the incubative period, there was no longer anything to be feared from infection from this source; and, as fourteen days had also passed since the deaths on board without the appearance of any new cases, I had become fully satisfied that Dr. Fassig had likewise contracted the disease on shore, and that there was no longer any good reason for supposing the germs had been introduced by those who had suffered from the disease. Still, as there remained the possibility of the conveyance of the infection by some other channel, and the chance of its having escaped destruction by the disinfectants, I did not feel justified in assuming the responsibility of advising that we should proceed with a single medical officer, and, therefore, stated that it "might perhaps be prudent to favorably entertain the kind offer."

With the view of guarding against the further development of the disease from infection that might be lurking somewhere in the ship, I obtained permission from the captain to subject the interior of the vessel to a general fumigation with nitrous acid. Accordingly, on the 18th instant, the crew were ordered to the spar-deck, the air and gun ports closed, and vessels with nitric acid and strips of copper having been placed in the holds and different compartments of the gun and berth decks, the hatchways were covered with tarpaulins, which were allowed to remain for more than an hour. On inspecting the ship after

of other compounds, some of which are undoubtedly inert, must be still more unsuitable for disinfecting.

The action of nitrous acid, on the other hand, is clearly understood, being the result of the facility with which it parts with a portion of its oxygen to substances capable of being oxidized. Its power in removing the odor from decomposing animal matter is very great, as I have had occasion to demonstrate frequently on board this vessel by the rapidity with which it removes the offensive effluvia arising from rats that have died in various parts of the ship. Parkes also speaks of its destroying the odor in dead-houses sooner than any other gas, while Ramon de Luna claims decided results from its use both in cholera and yellow fever; Parkes likewise recommending it in conjunction with chlorine for disinfecting the holds of vessels before disturbing the cargoes. Although irritating to the lungs when developed from strong nitric acid, I have found that it could be used locally without injurious effects by diluting the acid slightly with water. As a means of effecting the general fumigation of a vessel, I am convinced that it is far superior to either chlorine or sulphurous acid, on account of the ease with which it can be generated, and from its not leaving any unpleasantly irritating odor after its work is done. By dividing the quantity to be used into a number of small portions, which were then placed in the several holds, orlops, gun and berth decks, I succeeded in filling the whole of the interior of the ship with the fumes with the expenditure of a very moderate amount of acid. From my late experience with nitrous acid as an efficient and ready means of disinfecting both locally and generally, I do not hesitate to recommend that the medical department of all vessels cruising on stations where infection from yellow fever is likely to occur should be liberally supplied with nitric acid. On leaving Rio de Janeiro, a little more than one pound of nitric acid was all that was known to be on board; but after the appearance of the

disease, being anxious to employ it as a disinfectant, I ordered a thorough examination of the store-room, when five additional bottles were discovered; and probably to the fortunate addition of this extra amount to our slender stock may be attributed the preservation of the vessel from infection. A few days since the injurious effect it would have on the machinery was urged against the use of nitrous-acid fumes on board ship by an officer high in authority. Having now fumigated the vessel twice in this way, without any appreciable damage having been done to any part of the engine, as I have been informed by the chief engineer and others connected with his department, it would appear that no objection can be based on its chemical action on metallic surfaces.

Having come to the conclusion some time before the fumigation was effected that the disease in all four cases was due to the infected condition of the atmosphere in Rio de Janeiro, as the vessel would be ready for sea about the 20th of May, it not only did not appear necessary to remain any longer in the port of Bahia, but, on account of the quantity of rain that had been falling, rather important to leave as soon as possible, as by so doing in twenty-four hours there was every prospect of being in cool, clear weather; accordingly, the vessel left Bahia early on the morning of the above date, and after a pleasant passage of thirty-six days we were reported off Cape Henry June 25, arriving at the quarantine station, Norfolk, Va., in the afternoon of the same day, from which point I reported to the Bureau that no new cases had occurred during the passage, and that the sanitary condition of the vessel was excellent. The facts of our being quarantined at this place, and of our leaving the station for Fortress Monroe, where, on the recommendation of the senior medical officer stationed at this point, we were granted pratique by General Barry, have also been communicated.

As there are some medical points in connection with the individual cases of yellow fever that occurred on board this vessel, and some general conclusions and data of interest that would not naturally find a place in the journal of practice, I have deemed it advisable to insert them in the present report.

In the first place, in regard to the type of the affection, adopting the classification of La Roche, in the cases of Doctors Denby and Fassig and Lieutenant Bolles, the disease was evidently of the adynamic or typhoid grade of the congestive form. In Dr. Denby's case the typhoid tendency became very marked immediately after the subsidence of the febrile stage, which was merely what might have been expected, as he had been more or less of an invalid during the whole time he had been on the station, and had likewise suffered from a severe attack of diarrhœa in Montevideo. Moreover, he had been in the habit of taking frequent doses of Laville's and Reynolds's preparations for rheumatism, and had used both potassii bromidum and hydrate of chloral to a very great extent for the relief of insomnia; so that in his sickness the system responded but feebly to the impression of the remedies employed. Mr. Bolles's case presented the typhoid character in a less marked degree, but sufficiently to show a deficiency of vital power, while the prostration and rapid pulse from the beginning of Dr. Fassig's case plainly indicated that the tone of the system must have been very far below the normal standard, which was readily accounted for by his having been a close student for some years past, at the expense of his physical development, and likewise by his devoting himself to his books to a late hour every night, whereby he deprived himself of the amount of sleep necessary for the proper performance of the reparative processes. The disease in Mr. Murdock's case was of the mild inflammatory grade, and yielded readily to treatment.

A marked feature in all the fatal cases was the albuminous

condition of the urine. In each, the reactions with heat and nitric acid indicated the presence of albumen from the third or fourth day, with a daily increase in the amount, a diminished quantity of fluid, and finally suppression in the cases of Dr. Denby and Mr. Bolles. Although Dr. Fassig's urine contained a very large amount of albumen from the fourth day of his illness, the secretion continued in fair quantity until the last. The irritability of the stomach was most persistent in the cases of Dr. Denby and Mr. Bolles, this symptom being relieved in Mr. Murdock's case by lime-water and milk, and in Dr. Fassig's by a mixture of creosote and bicarbonate of soda. Mr. Bolles was the only one who had black vomit. Dr. Fassig had expectoration of dark-colored mucus, with slight hæmorrhage from the mouth before leaving the ship and after removal to the hospital. The alimentary canal was likewise involved to a great extent in all the cases resulting fatally; and early in Dr. Fassig's illness the stools became dark-colored, ultimately assuming a tarry consistence, with shreds.

The treatment was conducted on general principles, with the hope of relieving the symptoms as they presented themselves. Lime-water and milk and creosote were used to allay the irritability of the stomach, in conjunction with sinapisms to the epigastrium; externally, dry-cupping, counter-irritation, with sinapisms, and tincture of iodine and ammonia, fomentations, and the warm bath, and internally spirits of niter, the citrate, acetate, and chlorate of potassa, were ordered to combat the albuminous condition of the urine and suppression. Bromide of potassium was given for its hypnotic influence, with quinine in tonic doses, and beef-essence and stimulants in the quantities demanded by the nature of each case. Of the special remedies recommended as parasiticides, none were at hand, except carbolic acid. As there is good reason for believing that the germs act merely as a ferment or catalytically on the fluids and tissues of

the body, and that they are either destroyed, or at least do not multiply, after their introduction into the system, and as the action of carbolic acid on low forms of life has been shown to extend only to the retardation of the decomposition, and not to the total destruction of such bodies, I did not consider it necessary, with the experience I had already had of the negative results of its internal use, to try its effect in these cases. The decided benefit obtained from the use of the sulphites in intermittents would have led to their employment in connection with the other treatment had they been on hand.

The period of incubation has been a point of considerable interest to me in connection with these cases, particularly as late observations have shown that the limit should be extended to probably eighteen or twenty days from the date of exposure. A careful inquiry into the movements of the patients has elicited the following information:

Dr. Denby visited the shore on the afternoon of April 12, and the next morning made his visit to Enchadas Island, his last visit to the city being on the 21st, when he only remained long enough to make a few purchases. As he had passed a very restless night previously to going to the island, and complained of being worn out and feeling unwell, I consider that he received the infection at that place, and, as the disease appeared on the 27th of April, thirteen days constituted the incubative period in his case. Mr. Bolles's last and only visit to the shore was on the 13th of the same month, and he returned to the ship after being exposed for over an hour after dark in an open boat during a heavy rain-storm, and this after a walk of some six miles in the sun. The period of incubation in his case was, therefore, fifteen days. Mr. Murdock went on shore but once, and returned much fatigued by a long walk outside the city. As the 16th was the date of this visit, the disease manifested itself with him on the fifteenth day. It is more difficult to fix the precise

period in Dr. Fassig's case, as, being caterer of the mess, he had occasion to go ashore frequently. Having been taken sick on the afternoon of the 3d of May, the shortest limit of the incubative period would be twelve days, if calculated from the date of leaving the port; but, as he may have contracted the infection at any time during the ten days we remained in this harbor, the time may have been considerably longer. Since our arrival in the United States news has reached us of the death on board the United States steamer Monongahela of Mr. Coleman, who was attached to this vessel until the 21st of April last. As he was taken sick on the 23d of the same month, and must consequently have been under the influence of the disease while on board this vessel, it will not be considered improper to notice the remarkably short period of incubation in his case, namely, either five or seven days, he having only been on shore on the 16th and 18th days of April.

Considering that the question of temperature might be an interesting one in connection with the disease, and our fortunate escape from infection and the consequent extension of the malady, I have drawn up the following table, wherein I have divided the time from arrival in Rio de Janeiro to July 1 into parts, so as to show the averages, maximums and minimums, during our detention in ports, and on the separate portions of the homeward-bound passage.

Table of temperatures in ports and during passages from April 10 to July 1, 1875, inclusive.

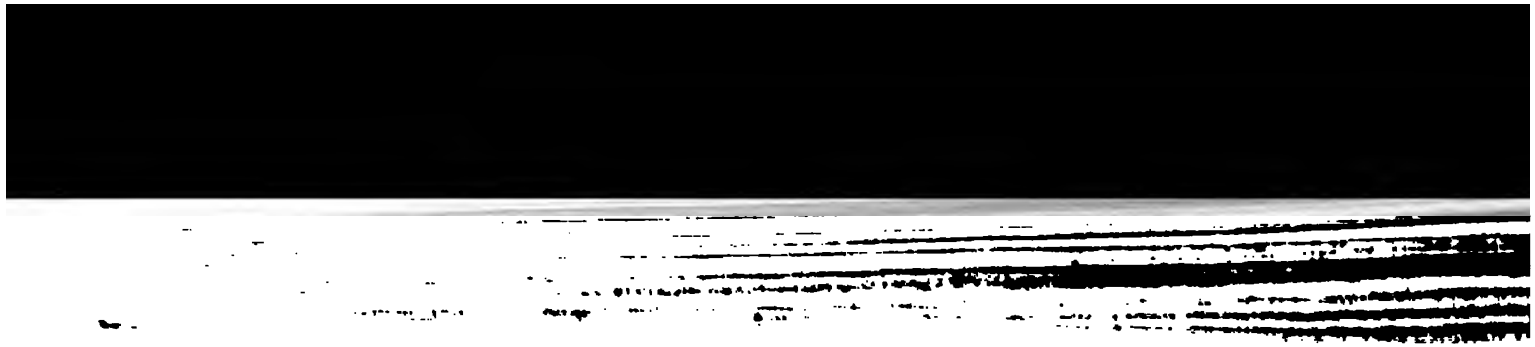
	Number of days.	Average.	Maximum.	Minimum.
Rio de Janeiro, from 10th to 22d of April	12	73	84	64
Homeward passage to latitude —, longitude	12	75	84	70
Passage from above latitude to Bahia	5	77	86	72
Bahia, from 9th to 20th of May	11	75	79	72
Passage to Norfolk, Va	36	76	84	74
Quarantine station and Fortress Monroe, from 25th June to 1st July	6	82	90	73

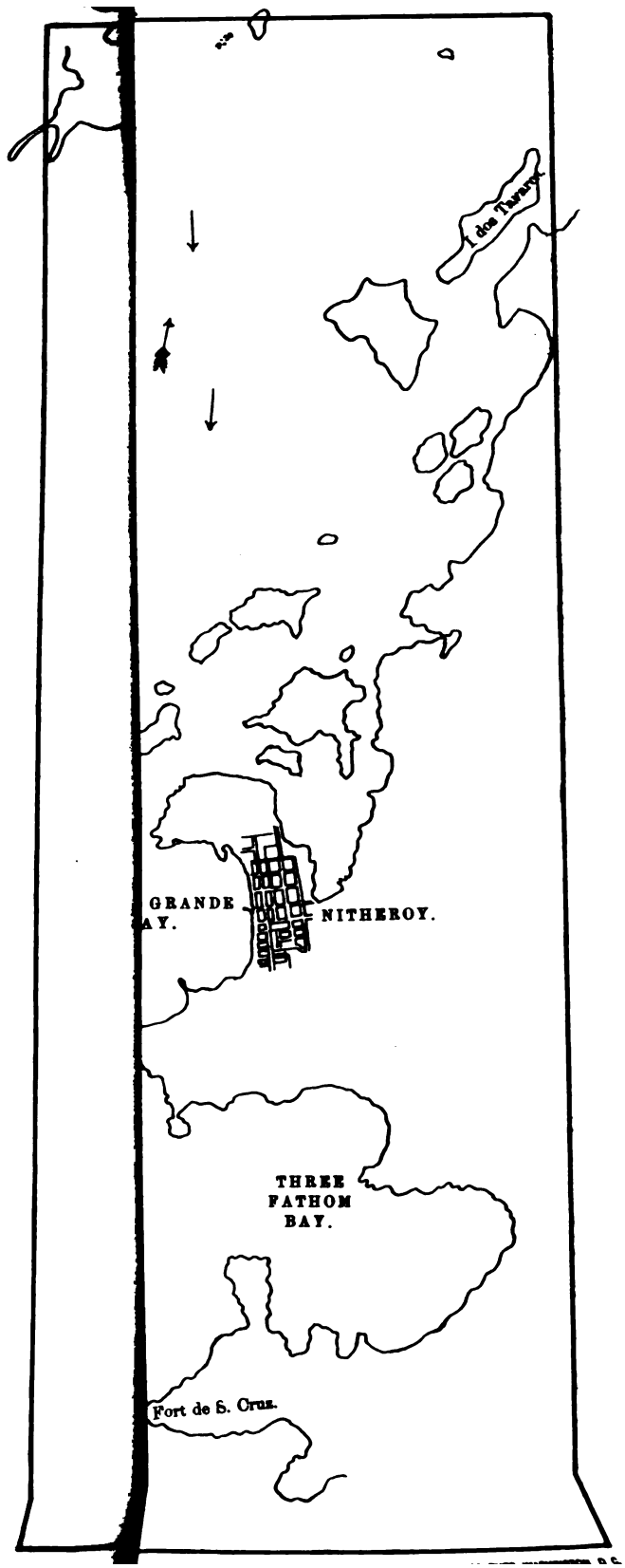
The high average on the passage to Bahia, after the change of course, was occasioned by a calm of one day's duration, during which the thermometer rose to 86°. It will be noticed that the highest average temperature to which this vessel has been subjected for several consecutive days has been since our arrival in the United States. Of the policy of allowing a vessel suspected of being infected with yellow fever to remain a week in a port, when the average of the thermometer was 82°, I shall not venture to speak, as I am totally in the dark in regard to the reasons that led to a detention, which, under other circumstances than those actually prevailing on board this vessel during the passage and at the time of our arrival, might have been attended by serious consequences.

Meteorological register of U. S. S. Lancaster, South Atlantic station, for first and second quarters, 1875.

Month.	Thermometer.						Barometer.			Winds.		Rain.
	Dry bulb.			Wet bulb.								
	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Prevailing direction.	Force.	Number of days.
January*	84	54	67	79	52	67	29.98	29.71	29.85	S. & E.	3	8
February*	78	60	71	84	64	68	30.13	29.74	29.81	N. N. E.	3	6
March*	76	58	68	76	58	67	30.20	29.76	30.06	S. S. E.	3	4
April†	78	66	71	77	63	70	30.30	29.83	30.02	E.	2	9
May‡	86	73	77	80	71	75	30.19	29.91	30.06	S. E.	3	27
June§	86	75	78	87	77	73	30.32	29.97	30.02	N. E. & S. W.	2	7

* At anchor, Montevideo, Uruguay.
† Passage to Rio de Janeiro.
‡ At anchor in Bahia, and passage to United States.
§ Passage from equator to United States.




des Tamares
GRANDE
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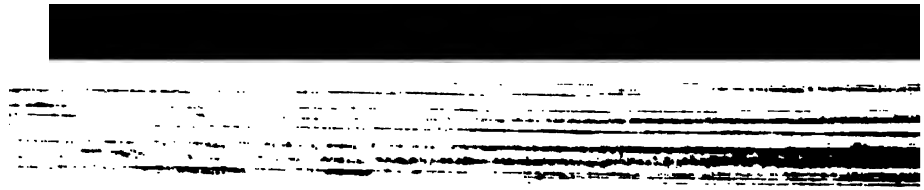
BAY.
Fort de S. Cruz.

ERRATA.

Page 7, fourteenth line from the bottom, for *are* read *is*.
Page 48, last line, after *gardia* insert a *semi-colon*.
Page 55, foot-note, for *Part* 11 read *Part II*.
Page 79, eleventh line from the bottom, omit *is* after *and*.
Page 97, tenth line from the bottom, for *crookers* read *croakers*.
Page 110, thirteenth line from the top, insert a *comma* after *own*.
Page 157, for *chlorine of magnesium* read *chloride of magnesium*.
Page 180, for *Miller* read *Müller*.
Page 218, for *stratuus* read *stratum*.
Page 408, for *scabes* read *scabies*.
Page 475, for *conjunctivæ* read *conjunctiva*.
Page 481, for *nuxis* read *nucis*.
Page 496, for *shall* read *will*.
Page 508, for *Shanghgi* read *Shanghai*.
Pages 517–519, for *frænum* read *frænum*.
Page 610, for *D. Marson* read *Dr. Marson*.
Page 678, for *infrascapular* read *infraclavicular*.

781-792



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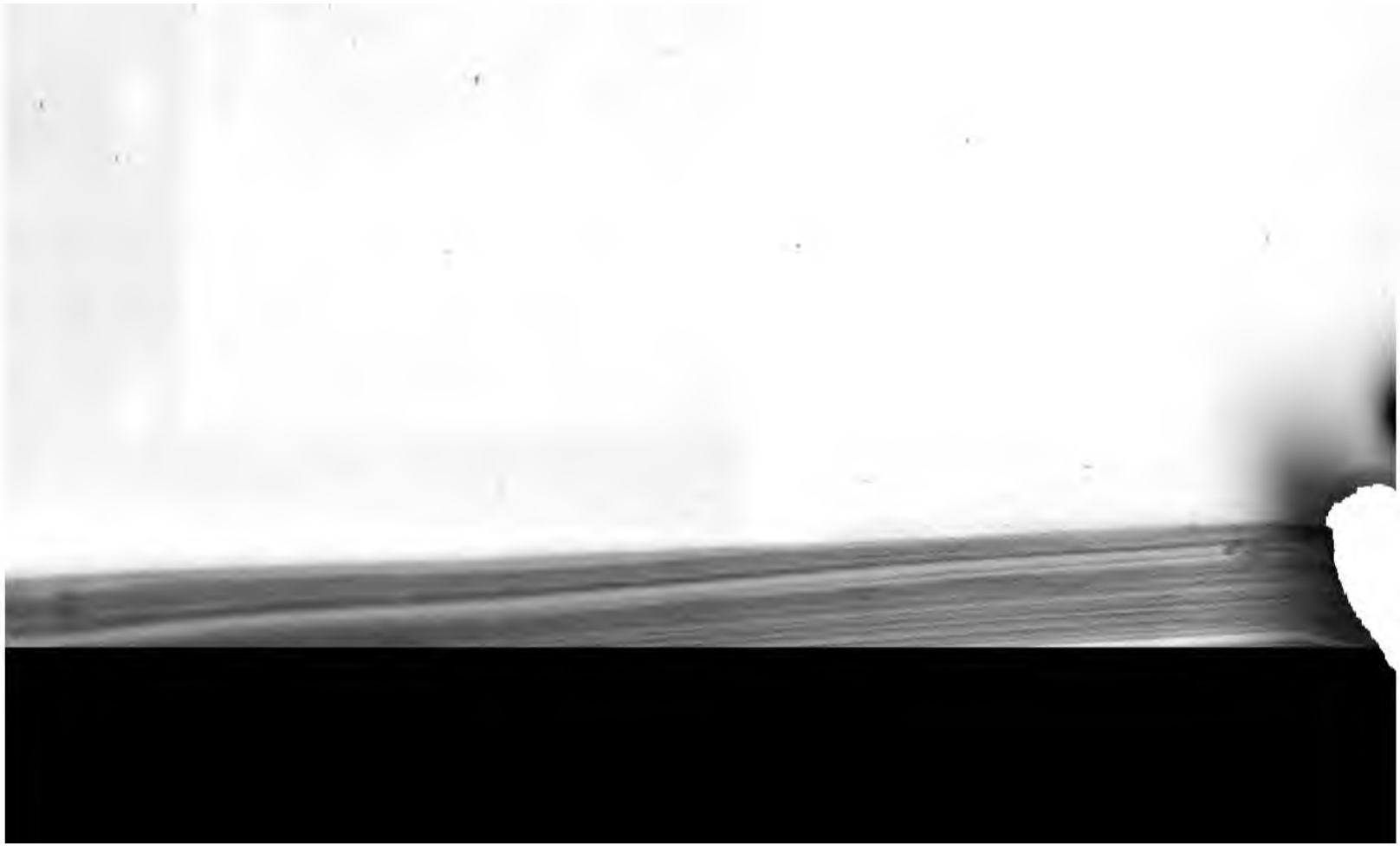

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